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Arizona Corporation Commission
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IN THE MATTER OF COMPETITION IN THE PROVISION OF ELECTRIC SERVICES THROUGHOUT THE STATE OF ARIZONA	**DOCKET NO. U-0000-94-165** APS

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SUPPLEMENTAL AND REPLY COMMENTS OF ARIZONA PUBLIC SERVICE COMPANY

If any one theme emerges from the hundreds of pages of comments filed by the parties in this proceeding thus far, it is this: the widely divergent and inconsistent positions taken on the scope, pace and mechanics of retail electric competition make it very clear that the Arizona Corporation Commission ("Commission") should refrain from adopting the Proposed Rules at this time. The Proposed Rules simply do not provide a solid framework for the competitive retail electric market they envision. Rather, they present a bare skeleton that cannot be successfully brought to life. Further resuscitation efforts will only <u>delay</u> the creation of fair, open and efficient competitive power markets in this state.

Because of its strong support for the prompt introduction of customer choice in a manner that will provide overall net benefits to the State, Arizona Public Service Company ("APS" or "Company") asks the Commission to indefinitely defer adoption of the Proposed Rules and immediately schedule the necessary evidentiary hearings so that the Commission can lawfully develop an effective retail competition plan as soon as practicable. Such hearings can easily be scheduled in the first quarter of 1997. The Commission can then coordinate its findings and conclusions with the Joint Legislative Study Committee on Electric Industry Competition Report to the Arizona Legislature and, with proper legislative authorization, direct retail competition to begin as determined appropriate. APS pledges to fully and enthusiastically participate in the development of sound, workable Commission rules.

APS's Supplemental and Reply Comments are divided into two sections. In Section I, the Company will summarize the attached reports from various experts APS has asked to examine the Proposed Rules. These experts are either veterans of electric utility industry reform elsewhere with first-hand knowledge of the massive restructuring efforts required by all interested participants or are familiar with Arizona regulatory policy and the economic climate of this state. As vigorous advocates of competition, they will offer observations that confirm the wisdom of correctly establishing the transition rules toward retail competition <u>now</u>, rather than relying on the vague and incomplete directives in the Proposed Rules in the hope that their manifest deficiencies can somehow later be corrected along the way. Section II of the Company's response will contain a reply to the many comments filed to the Proposed Rules by other parties on November 8, 1996. APS will not repeat herein the virtues of APS' own comprehensive Arizona Customer Choice Plan for retail access and its previous comments addressing the Commission's lack of legal authority to adopt the Proposed Rules in their present form and the many substantive deficiencies in such areas as stranded cost recovery, obligation to serve, rate unbundling, reciprocity, regulation of competitive providers, and transition and implementation details.

I.

SUMMARY OF COMMENTS ON THE PROPOSED RULES FROM OUTSIDE EXPERTS

APS has asked several outside experts to review and evaluate the Proposed Rules. The results of their review are attached to these comments in the form of "question and answer" testimony, both for ease of reading and to underscore why evidentiary hearings are the appropriate

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means to resolve many of the critical issues left unaddressed by the Proposed Rules. As the following summary demonstrates, the Proposed Rules clearly should not be adopted in their present form.

ELLIOT D. POLLACK

Mr. Pollack is the President of Elliot D. Pollack and Company, an economic consulting firm which provides consultation on all aspects of the Arizona economy. He is a recognized expert in his field and has conducted a number of economic impact studies for various state and local tax governments and private business interests. Mr. Pollack was asked to review the economic impact statement ("EIS") accompanying the Commission's Staff's October 1, 1996 transmittal of the competition rules. In general, Mr. Pollack concludes that the Staff EIS fails to provide meaningful information about the possibly significant impacts that could arise as a result of the introduction of retail competition in the state's electric utility industry. At best, he finds the Staff effort a very rudimentary outline characterized by unsupported generalizations. He also concludes that the Staff EIS fails to meet the Arizona statutory requirements for the preparation of such studies.

Mr. Pollack examined several possible economic impacts from the Proposed Rules. Based on his review, he concludes that the Proposed Rules could, under existing tax laws, reduce state and local tax revenues by almost $1,000,000,000 over the five-year period 2003-2007. In the year 2003 alone (the year in which the Commission envisions full retail competition), the annual loss of state tax revenues could be as much as $184.3 million.

Mr. Pollack also reviewed the mandated solar portfolio requirement in the Proposed Rules. He found it to be an ill-conceived and very expensive subsidy (costing over $437 million for APS alone) that is unlikely to significantly benefit the state, could suppress the competition the Commission hopes to promote, and would be a far less effective means than available alternatives to preserve and protect the Arizona environment.

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DR. JOHN H. LANDON

Dr. Landon is a Senior Vice President of National Economic Research Associates, Inc. an economic consulting firm. He has also previously testified before the Commission on a variety of economic and regulatory matters. He and his firm have been involved in some of the most prominent efforts to restructure energy markets and were instrumental in setting up the United Kingdom power pool and the associated spot market for retail open access. In the United States, NERA has been an active participant in the electric restructuring docket in California and is currently addressing restructuring questions in at least 15 states and two Canadian provinces. NERA has also been an active participant in the deregulation of the U.S. gas and telecommunications markets as well as electric industry restructuring activities in Norway, Sweden, Chile, India, Columbia and Northern Ireland.

Dr. Landon finds that the Proposed Rules fail to provide even a minimally adequate framework for the retail markets they seek to create by delegating to "workshops" nearly all of the threshold substantive concerns that need to be addressed. He also finds that the costs and benefits of retail access in Arizona have not been adequately identified or evaluated, nor has the Staff sufficiently recognized that initiating a competitive market will disadvantage some consumers while leaving others better off.

Dr. Landon is highly critical of the Proposed Rules' failure to resolve a number of fundamental complex technical and logistical issues, such as the governance of transmission networks, the preservation of system reliability under competition, the development of pricing mechanisms for real-time power purchases, the design of new metering and customer billing systems, the establishment of a settlement and reconciliation process, the creation of a market for ancillary services, and the implementation of workable rules for stranded cost recovery and reciprocity. Dr. Landon outlines how these deficiencies would likely lead to (1) less than optimal use of generation and transmission resources, (2) higher than necessary system costs, (3) reduced power quality and reliability, (4) ineffective price signals and market instability, (5) massive litigation and confusion caused by lack of fully developed and tested settlement protocols at the supplier level and inaccurate and untimely billings at the customer level, and (6) increasing customer frustration and complaints as competition fails to deliver the promised net benefits to society.

As a result, and after considering the considerable transition difficulties faced in England and elsewhere, Dr. Landon believes that the timing proposed for implementing retail access is too ambitious and inconsistent with the sketchy nature of the Proposed Rules; moreover, the scope of participation, especially in the first phase, is too broad.

Dr. Landon considers the Proposed Rules' provisions for a solar subsidy to be arbitrary and in conflict with the Commission's otherwise stated objective to provide customers greater flexibility in choosing their electric supply. There is a lack of economic evidence that the solar program, as devised by the Commission's Staff, will provide substantial net benefits for Arizona consumers or will actually foster the commercial development of solar technology. In fact, the use of a quota system to subsidize solar development will likely distort markets for solar and other renewable resources. Dr. Landon recommends that the development of a solar policy be settled in a separate proceeding after a careful analysis of the costs and benefits of alternatives.

Finally, Dr. Landon concludes that there is no reason Arizona must follow California and adopt retail access as soon as possible. The relative level of regional market prices over the next several years is very unlikely to change as a consequence of which states first provide retail access. In addition, many of the same firms will market in both California and Arizona. The resources they acquire are not likely to be dedicated to a specific market. Finally, low cost resources will be sold at market prices, not at their cost, and therefore will more likely be sold in states that develop the most efficient and effective markets, not those who hurry and make decisions which, after the fact, will be found to be ill-considered.

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JAMES V. BARKER, JR.

Mr. Barker is the Vice President of Management Consulting Services of KEMA-ECC, Inc. He is an engineer with a primary focus in the area of bulk power trading. He has been responsible for the federal government's program to promote interconnection and trading under the Federal Power Act and has had "hands on" experience in many aspects of the design, implementation and operation of power pools. Since 1988, his primary efforts have been concentrated in implementing open access markets and electric industry restructuring in the U.S., England and Wales. Mr. Barker was requested to review the reliability provisions of the Proposed Rules.

Mr. Barker concludes that the Proposed Rules will not, in their present form, adequately preserve the reliability and integrity of electric supply and that the proposed implementation timetable is likely to prove unrealistic. He further finds that the Proposed Rules do not reflect a comprehension of the existing state of reliability, how it is currently maintained, and the extensive work which has begun, but is not yet complete, to develop a technical framework for ensuring reliability in a world in which individual customers may shop for electricity from a multitude of diverse and disaggregated service providers. Mr. Barker stresses that the current system of reliability guidelines and standards was designed for a much smaller number of participants in the electricity market and on an assumption that the entity which dispatches and controls a portion of the electric network would also own and operate both generation and transmission. This may or may not be true in the future. Experience in deregulation in foreign electricity supply industries have involved structures considerably less complex than one finds in the U.S. with its diverse mix of ownership of assets, pre-existing contractual rights and two-tiered economic regulation. Moreover, foreign retail competition efforts have focused primarily on the commercial and industrial sector to date, leaving retail competition at the residential level at an embryonic stage of development. As a result, considerable work remains in order to extend the existing operating regime and the related market instruments to a competitive retail marketplace that maintains the quality and reliability of service which Arizona customers have come to expect.

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Mr. Barker then focuses on the various issues that the Commission must promptly address, including reliability guidelines and standards, adequate transmission and generation investment incentives, operational impacts, operating culture concerns, the need for a regulatory "safety net," and enforcement and protocol measures. He concludes with a plea that the Commission immediately commence a very intensive effort involving substantial involvement from all market participants to develop the very complex commercial, technical and market "rules of the road" necessary to maintain system reliability.

WILLIAM H. HIERONYMUS

Dr. Hieronymus is a Director at the economic and management consulting firm of Putman, Hayes & Bartlett, Inc. Dr. Hieronymus has previously testified before the Commission on a variety of utility issues. He has been directly involved in the efforts to restructure the electric industry in the United Kingdom, New Zealand, Australia, South America, Spain, Hungary, the Ukraine and currently in the European Union. He and his firm have also been the principal consultants for utilities in New York and those in the Pennsylvania- New Jersey-Maryland pool, Wisconsin, California and other states with respect to retail competition issues. His firm is the source of much of the current conceptual framework for electric utility industry restructuring.

Dr. Hieronymus concludes that the Proposed Rules should not be adopted in their current form because they fail to address important, complex issues that are unavoidably raised by the introduction of retail competition and whose resolution is essential <u>prior</u> to implementing a competitive market. He is also critical of the process by which the Commission has developed the Proposed Rules to date and by which it proposes to add further refinements through workshops in the future. Dr. Hieronymus identifies and discusses in detail many of the important issues that the Commission must decide to lay the proper foundation for retail competition which are unaddressed or inadequately resolved in the Proposed Rules. Among these issues are the maintenance of reliability (Dr. Hieronymus finds the Proposed Rules to be "absolutely irresponsible" in this regard), how the Arizona electricity system will be coordinated to assure the minute-to-minute matching of load and generation, the development of an appropriate wholesale spot market, the role the Commission may wish to take in determining transmission tariffs and ancillary services, the polices to guide tariff settings, the enforcement of in-state reciprocity, and the determination and recovery mechanisms for stranded costs.

From his experience in the deregulation efforts in other jurisdictions and countries, Dr. Hieronymus has learned that mistakes made in the hasty and ill-conceived introduction of competition are difficult to remedy later since market participants gain a stake in the then-existing structure and rules and are in a much better position to block changes then they are before competition is introduced. He has also concluded that only when regulators have first established the basic architecture of the new system, can progress be made on implementation. Dr. Hieronymus provides specific examples of how other jurisdictions have almost universally underestimated the difficulty and complexity of restructuring as well as the time it takes to get the rules and market institutions right. Unless the threshold issues are accurately defined and properly resolved, the Commission's effort will not produce the hoped for benefits, and retail competition will be inefficient and unfair.

Finally, Dr. Hieronymus concludes that there is no factual basis for the concern that if California opens its retail market significantly ahead of Arizona, suppliers to California customers will contract for all of the cheap power available in the Western region. Arizona can thus take the time to get the market institutions and pricing rules right without fear that the cheapest supplies will be committed to the California market.

II.

REPLY TO OTHER PARTIES' COMMENTS

Fifteen parties have filed comments concerning the Commission's Proposed Rules on retail electric competition. These comments run the gamut from outright, unqualified support for the proposed action, to substantial concern for a variety of issues including, among others, reliability; the lawfulness of the Proposed Rules; the scope of "Affected Utilities," the phase-in of retail

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electric competition in Arizona; the "Affected Utilities'" obligation to serve; their recovery of stranded cost; market structure; the Solar Portfolio; and the participation of utilities not subject to Commission jurisdiction in retail electric competition.

APS has given careful consideration to the positions taken by these commenting parties. Many of the comments touch upon matters already addressed in the Company's earlier filings in this docket, including its comments filed on November 8, 1996. Inasmuch as the Company's comments to date already fully state its position on the numerous complex issues presented by the Proposed Rules, APS is limiting these reply comments to substantial issues raised by several other parties. Thus, the fact that APS has chosen not to reply to each and every issue or position asserted by the other parties in their submittals, should not be taken as an acquiescence on APS' part to the positions thus taken, or as an expression (*albeit* a silent one) of the Company's support for any positions taken by the other commenting parties.

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A. INCLUSION OR EXCLUSION OF CERTAIN ELECTRIC UTILITIES FROM THE DEFINITION OF "AFFECTED UTILITIES."

Comments filed by Salt River Project ("SRP") and the rural electric cooperatives ("Cooperatives")[1] address the Proposed Rules' impact upon electric utilities either included or not included within the definition of "Affected Utilities."[2] SRP argues that the Proposed Rules preclude it and its customers from the opportunity to benefit from retail electric competition (SRP, at 1); that any proposed regulation of a political subdivision by the Commission would be unconstitutional (SRP, at 2); that SRP's plan to create a marketing affiliate to participate in retail electric competition is an appropriate solution to the quandaries posed by application of the Proposed Rules to municipal utilities (SRP, at 4, footnote 1); and that use of an intergovernmental agreement between SRP and the Commission for "reciprocal" retail competition would provide

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[1] Including Arizona Electric Power Cooperative, Duncan Valley Electric Cooperative, Graham County Electric Cooperative and Sulphur Springs Valley Electric Cooperative.

[2] Proposed R14-2-1601(1).

appropriate statewide competition (<u>SRP</u>, at 4). On the other hand, the Cooperatives, already included within the definition of "Affected Utilities," claim that they should be exempted from the proposed Rules until that are afforded the opportunity to resolve tax exempt status issues and pre-existing contractual obligations, or they decide to voluntarily participate in retail electric competition (<u>Cooperatives</u>, at 2-3).

SRP's interpretation of the Proposed Rules is simply incorrect. Nothing in the Proposed Rules preclude SRP from offering its customers the benefits of retail electric choice. Under the Proposed Rules and subject to existing contractual arrangements, SRP may also participate as a competitive seller, provided that the Affected Utilities consent to that participation, <u>and</u> SRP agrees to or can otherwise be regulated to the same extent as the "Affected Utilities.". In significant respect, the concern underlying the need for the Affected Utilities' consent goes to the issue of reciprocity. It would be inequitable to allow SRP to compete in the service areas of the Affected Utilities without first requiring it to grant equivalent rights to the Affected Utilities and without removing SRP's existing artificial legal preferences and other advantages.

Ironically, SRP seems to want into the competitive marketplace but does not want to be burdened with the obligation to adhere to the same rules as do the Affected Utilities in respect to the dictates of the Proposed Rule. Read literally, SRP appears to want all the benefits but none of the burdens. That appears to be the real-world meaning of SRP's claim that the Proposed Rules, as applied to SRP, would be unconstitutional.

But there is an even greater significance to the points raised by SRP -- that is the plain fact that retail electric competition throughout Arizona cannot be implemented by the Commission on a go-it-alone basis. Because of the strictures of existing law, the transition from regulated monopoly to fully competitive retail marketplace must be the result of coordinated efforts between the Commission and the Legislature. SRP's arguments only make that point more compelling.

As much as SRP seems to be fighting to get in, the Cooperatives seem to want to get out.

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APS is neutral to the changes sought by the Cooperatives[3], provided that the changes are, in fact, administered fairly -- meaning that if any one of the Cooperatives opts out, for the time being, from the definition of "Affected Utilities," it may not, in the interim, directly or indirectly attempt to market electricity in the service areas of the remaining members of the "Affected Utility" category.

B. STRANDED COST RECOVERY.

Arizona Community Action Association, Arizona Consumers Council and Arizona Citizens Action (collectively "ACAA, *et al*") suggest in their jointly filed comments that the stranded investment provisions of the Proposed Rules should be amended to include as considerations new revenue opportunities made available under the competition allowed under the Proposed Rules and previously compensated risk (ACAA, *et al*, at 5). Aside from the ability to directly make electric sales into the service territories of other "Affected Utilities" (already taken into consideration by the Proposed Rules), there simply are no "new revenue opportunities" created by the Proposed Rules. Moreover, there is no evidence presented by ACAA, et al., (nor does such evidence exist) that APS or any other "Affected Utility" has received any "prior compensation" for the risks imposed upon them by the Proposed Rules.

C. METERING, LOAD DATA AND CONFIDENTIALITY

RUCO suggests that load research data can be used in place of metering (RUCO, at 2) and that the Proposed Rules should be amended to require load data to be released to electric suppliers, even in the absence of customer requests to do so (RUCO, at 4). These recommendations are troublesome in at least two respects.

First, RUCO's alternative approach to metering, although creating the illusion of efficiency, actually injects a needless element of additional risk into the marketplace. Load

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[3]APS does find it ironic that the two "impediments" to competition cited by the Cooperatives, namely becoming subject to income taxes and struggling with what are essentially "stranded costs," are both already existing "facts of life" for investor-owned "Affected Utilities."

research data can never accurately replace metering as a means of ascertaining energy sales and consumption. In the final analysis, the serving utility will be transformed into a banker, who will be extending credit to customers to the extent consumption actually exceeds historic load profiles. In fact, after a load profile is determined, it would be beneficial for a customer to modify actual consumption to take advantage of the banker. Moreover, the absence of meters will be an open invitation to fraud and confusion. If utilities are asked to subsidize this inaccuracy, electric rates will never be free of the cost of billing deficiencies which will have to be spread across all the customers. This "surcharge" would be an ironic consequence of retail electric competition, given the stated objective to lower electric bills. Finally, the absence of individual customer metering will mark the end of DSM. There is little need to spend money on managing load or conserving energy if bills are based on class load profiles and not individual usage.

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Second, indiscriminate sharing of load data, especially without the customer's request, presents a substantial opportunity for confusion, fraud and impairment of customer prerogatives. No customer should be threatened with the prospect that his load data, purchasing practices, consumption histories and prices are fair game for the asking. Customer consent should be required before load information and consumer histories are shared with others. A broadly painted rule like that proposed by RUCO cannot fairly apply without harm to a substantial segment of customers given the countless variances in customer circumstances and needs.

D. RESTRUCTURING AND DIVESTITURE

In its comments, RUCO suggests that the Commission should require divestiture or at least functional separation of generation and competitive services by distribution utilities (RUCO, at 4); and, that a utility's stranded cost recovery should be influenced by its proposal for its own restructuring (RUCO, at 4). In Arizona, recovery of stranded cost is a right, not a privilege to be granted based on the "Affected Utilities" compliance with some ill-conceived and, in the case of divestiture, illegal Commission mandate. APS already exceeds the FERC's requirements for functional separation, and there has been no showing that APS or any of the other "Affected

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Utilities" exercise any market power in the region such as might necessitate further competitive safeguards.

E. STANDARD OFFER RATES

In their jointly filed comments, ACAA, *et al* propose that utilities should be challenged to include rate caps as a part of their Standard Offer Rates. The rate cap should remain in place until the Commission determines that competition has been substantially implemented in a manner that benefits residential consumers (ACAA, *et al*, at 2-3).

This one comment implies an unstated reality about retail electric competition that all concerned parties need to confront and understand early on in the process: competition will not necessarily equate to an overall lowering of retail rates. The unbundling of services and attendant rates for those services will no doubt result in a reordering of the costs and charges for those services. The Commission has followed a practice of embedding in rate structure some elements of cross subsidization. In plain fact, some customer classes bear the freight for other customer classes. Such will not necessarily be the case in a deregulated, competitive market. Clearly, until the market adjusts and corrects itself during the transition, some rates will increase while others decrease. Whether the Commission establishes, as a system benefit, some stipend for low income consumers to protect them from these swings, the fact remains that no one customer group can be assured a lowering of rates as a result of retail electric competition, nor is it fair to other customers that they should. Placing aside the merits of ACAA *et al's* positions here, issues such as these must be addressed by the Commission on a fully developed factual record before the Proposed Rules can be allowed to go into effect. In effect then, ACAA *et al's* position represents yet another substantial reason to defer adoption of the Proposed Rules until such issues can be fully and fairly sorted out, understood and sensibly addressed.

CONCLUSION

Recognized experts with years of "hands on" experience in actually designing and implementing electric restructuring or in assessing the economic impact of public policy changes are unanimous in their verdict on the Proposed Rules. They lack any evidentiary basis; are dangerously ambiguous and incomplete on critical issues; create expensive and ill-conceived mandates on "electric service providers;" and fail to recognize the vital role of the Legislature in any comprehensive electric industry restructuring. For these reasons and for all of the other reasons previously brought to the Commission's attention in APS' previous pleadings, APS urges the Commission to postpone adoption of the Proposed Rules and take the time to do this right.

RESPECTFULLY SUBMITTED this 27th day of November, 1996.

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November 27, 1996

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Re: Docket No. U-0000-94-165

Dear Sir or Madam:

Pursuant to the procedural order dated, October 11, 1996 in Docket No. U-0000-94-165, attached is an original and ten copies of Arizona Public Service Company's supplemental and reply comments.

If you have any questions, please contact me at 250-2031.

Sincerely,

Barbara A. Klemstine

Barbara A. Klemstine
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Attachment

CERTIFICATE OF SERVICE

For Parties of Record in Docket No. U-0000-94-165

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BEFORE THE

ARIZONA CORPORATION COMMISSION

DOCKET NO. R-0000-94-165

TESTIMONY

OF

ELLIOTT D. POLLACK

ON BEHALF OF

ARIZONA PUBLIC SERVICE COMPANY

NOVEMBER 27, 1996

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EXHIBITS Appendix

PREPARED TESTIMONY

OF ELLIOT D. POLLACK

INTRODUCTION AND SUMMARY OF CONCLUSIONS

Q: PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A: My name is Elliott D. Pollack. My business address is 7505 East 6th Avenue, Suite 100, Scottsdale, Arizona, 85251. My phone number is (602) 423-9200.

Q: WHAT IS YOUR CURRENT POSITION?

A: I am president of Elliott D. Pollack and Company, an economic consulting firm which provides consultation on all aspects of the Arizona economy. My educational and professional qualifications and experience are set forth in Appendix A attached to this testimony.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A: I have been asked by Arizona Public Service Company ("APS") to review the Economic Impact Statement ("EIS") prepared by the Arizona Corporation Commission Staff in support of the Commission's Proposed Rules ("Proposed Rules") to introduce competition and customer choice in retail electric markets in the State of Arizona. The EIS was attached to an October 1, 1996 memorandum to the Commission from its Utilities Division in the so-called "competition docket" (Docket No. U-0000-94-165). I was also asked by APS to independently examine possible economic impacts of the Proposed Rules in certain areas and to comment on the mandated solar portfolio standard contained in the Proposed Rules.

Q: WHAT IS YOUR BACKGROUND AS AN ECONOMIST?

A: I have been a practicing economist since the early 1970's. For 14 years (1974-1987), I was Chief Economist for Valley National Bank. Among my duties were responsibility for local, State and national forecasting to the Board of Directors, customers, businesses, industries and analysts. I have built econometric models of the State of Arizona, and was editor of the "Arizona Progress" and the "Arizona Statistical Review." I am currently owner of Elliott D. Pollack and Company, an economic consulting firm which provides consultation on all aspects of the Arizona economy. I am also an editor of the "Arizona Blue Chip Economic Forecast" published by Arizona State University. I am a member of the Arizona Economic Round Table, the Arizona Economic Estimates Commission, the Joint Legislative Budget Advisory Committee, the State Treasurer's Advisory Committee and chair of the Phoenix Commission on the Economy. I have been an advisor to many governments and corporations in the State.

Q: HAVE YOU CONDUCTED ECONOMIC IMPACT STUDIES IN THE PAST?

A: Yes, on many occasions. I have conducted economic impact studies for the Arizona Department of Water Resources, for the cities of Phoenix and Scottsdale, the Arizona Multihousing Association, the Arizona Builders Alliance, and the Tempe Rio Salado Project to name just a few. Appendix A lists my prior work in this area.

As a result, I have detailed knowledge of Arizona's taxing political subdivisions, Arizona's commercial and industrial base, Arizona's past economic growth cycles and comparative knowledge of Arizona's economy relative to adjacent states. I would not presume to conduct such a study for, say New Jersey, for the simple reason that I am not intimately familiar with that State's economy.

Q: ARE YOU GENERALLY IN FAVOR OF COMPETITION?

A: I certainly am. Overall, the benefits of price competition will be significant (if markets are open) and product and service innovation should add net economic value.

My education as well as my experience as a practicing economist since the early 1970s leads me to believe that a competitive situation is far better for consumers than is a regulated environment. Motivations change so that prices will be lower, service better, and innovation will occur at a more rapid pace. It is important that any restructuring rules should promote true competition and not just another form of regulation. The less regulation gets in the way, the more consumer benefits will be maximized.

Q: WOULD YOU PLEASE SUMMARIZE YOUR PRINCIPAL CONCLUSIONS?

A: My review of the Proposed Rules, the Staff EIS and related materials has led me to the following principal conclusions:

1. The Staff EIS is inadequate. It fails to provide meaningful information about the possibly significant impacts that could arise as a result of the introduction of retail competition in the state's electric utility industry and it certainly offers no economic support for the Proposed Rules. I don't believe a regulatory agency should consider basing a decision of such monumental importance to the citizens of this state on such a document.

2. The EIS fails to meet what I understand to be the Arizona statutory requirements for such a study that must accompany certain administrative rule makings.

3. Although it is a challenging task requiring suitable expertise, preparing an adequate EIS is a relatively straightforward process. I am aware of several impact studies prepared in other areas of the country regarding competition in the electric utility industry. Each of these studies indicate that there can be significant impacts on various sectors of the local tax economy brought about by customer choice that need to be considered and addressed by policy makers before competition rules are implemented.

4. Although I have not personally conducted a comprehensive economic impact study of the Commission's Proposed Rules, I have examined several possible impacts. Using what I consider to be reasonable assumptions, the Proposed Rules could reduce state and local tax revenues by almost $1 billion over the five year period 2003-2007. In the year 2003 alone (the year in which the Commission envisions full retail competition), the loss of state tax revenues could be as much as $184.3 million. This potential decline in government tax revenues would result, in part, from the electricity price decreases envisioned by the advocates of the Proposed Rules, coupled with the loss of incumbent utility market share to competitors licensed under the Proposed Rules but not fully subject to Arizona taxes. This revenue loss does not include any possible decline in property tax receipts caused by falling assessed values of uneconomic or shut down facilities.

5. In addition, competition could create conditions where relatively high cost electric generating units located in this state become uneconomic and are therefore shut down. Were such to occur, the economic impact would be dramatic in the predominantly rural areas where these plants are located. The drop in property taxes, the loss of jobs, the decline in local sale tax revenue and the overall diminution in related economic activity could devastate fragile rural economies.

6. The mandated solar portfolio requirement in the Proposed Rules is an ill-conceived and very expensive (over $437 million for APS alone) subsidy that is unlikely to significantly benefit the state, could suppress the competition the Commission hopes to promote, and is a far less effective means than other alternatives to preserve and protect the Arizona environment.

7. Retail electric competition in Arizona will bring many unanticipated and possibly unintended consequences. Among those may be a change in utility line extension policies. Existing utilities which retain a monopoly distribution function but are no longer the sole provider of generation services will soon have to recover extension costs over a smaller revenue base. As a result, any existing subsidies in utility extension policies could be eliminated thereby raising the direct costs of service connections. Based on preliminary estimates of possible extension policy changes, home prices could then increase noticeably.

I.

REVIEW OF THE STAFF EIS

Q: WHAT IS AN ECONOMIC IMPACT STUDY?

A: Properly conducted, an economic impact study examines the economic impacts, short and/or long term, of a proposed change (e.g., a new regulation or statute, or construction of a major state or federal project) in such terms as income, consumption, revenues, taxes, and employment. The hallmark of an economic impact study is that, to the extent possible, it quantifies economic impacts, thereby permitting decision makers, stake holders and the public to evaluate the potential costs or benefits of the contemplated action and the extent of the impact on various sub-groups. Absent an appropriate economic impact study, those entities and individuals who face the largest impacts may not have the time to adjust (or mitigate the pain) caused by the changing environment.

Q: HAVE YOU EVALUATED THE STAFF'S EIS?

A: Yes, I have. Without intending to demean this well-intentioned effort, I am surprised that a regulatory agency such as the Commission would consider basing a decision of such monumental importance to the citizens of this state on such a superficial document. As a professional economist who has conducted and reviewed many economic impact studies, the Staff's EIS is simply unacceptable. It does not give decision makers or the public critical information on the possible consequences of the Commission's far reaching competition rules. At best, it is a very rudimentary outline characterized by unsupported broad generalizations.

Q: WHAT ARE YOUR PRINCIPAL CRITICISMS OF THIS STAFF EIS?

A: First, the EIS fails to assess quantitatively the potential impacts of the Proposed Rules. Other than a partial and incomplete laundry list of possible costs and benefits associated with competition generally, the EIS does not quantify any specific costs or benefits that would result solely from the Commission's Proposed Rules. Thus, the reader is left to guess as to whether (and if so, when) the benefits of the Proposed Rules will outweigh its associated costs, thus leaving the State and its citizens better off, or whether the reverse is true. The EIS likewise fails to analyze or quantify specific micro, rather than macro, effects to determine which specific industries or classes of customers or citizens will disproportionately benefit or suffer under the Proposed Rules. The EIS also fails to explain whether the listed costs and benefits will occur in the absence of the Proposed Rules, such as through national or regional legislative or policy changes, greater competition in the wholesale generation market (that will be unaffected by the Commission's Proposed Rules), or technical innovations that would also occur independent of any Commission action.

Second, the EIS is misleading. A reader would complete a review of the EIS with the impression that the Proposed Rules will benefit Arizona through lower prices, technological innovation, greater customer choice, etc., all without any significant transition costs, additional operating expenses, regional economic dislocations or distributive income effects. Yet there is absolutely no quantitative or other support for such conclusions. It is entirely possible, as I will explain later and as studies elsewhere in the country have suggested, that retail access will produce a number of very significant adverse affects on state and local government, utility companies (and their workers and shareholders) and large customer groups. Yet such "downsides" are scarcely acknowledged in the Staff EIS and when they are, Staff appears to assume that they will in some unexplained way be offset by the Proposed Rules' benefits. An EIS must be an objective, dispassionate evaluation -- not an advocacy brief.

Third, the EIS is quite superficial in its coverage. In addition to the lack of <u>any</u> quantitative analysis, the EIS either ignores or barely mentions a number of obvious areas that would likely be impacted by the Proposed Rules. Such areas include the financial health of the incumbent utilities as markets will be opened to competition, the resulting impacts on utility shareholders, many of whom are retirees living on fixed incomes in Arizona, the reliability of electric service, the funding of critical state and local educational and social needs that will be impacted by changes in state revenues, environmental impacts associated with changing utilization of existing generation and transmission facilities and construction of new resources, etc.

Q: ARE YOU FAMILIAR WITH THE PROVISIONS OF ARIZONA LAW REGARDING THE TYPE OF ECONOMIC, SMALL BUSINESS AND CONSUMER IMPACT ANALYSIS THAT MUST ACCOMPANY THE PROMULGATION OF STATE RULES?

A: Yes, I have reviewed the provisions of A.R.S. § 41-1055 which describes in some detail the requirements for an economic impact statement.

Q: DO YOU BELIEVE THE STAFF EIS COMPLIES WITH THOSE REQUIREMENTS?

A: No, I do not. Although I am not a lawyer, state law appears to be quite clear that a thorough analysis of the "probable costs and benefits" of a proposed regulation must be conducted prior to the promulgation of regulations by administrative agencies such as the Commission. This analysis must include "the probable costs and benefits to businesses directly affected by the proposed rule making, including any anticipated effect on the revenues or payroll expenditures of employers subject to the proposed rule making." Furthermore, the agency is required to examine the "probable cost and benefit to private persons and customers who are directly affected by the proposed rule making." The EIS fails to meet this mandate.

Q: ARE YOU FAMILIAR WITH THE PROVISIONS OF STATE LAW, SPECIFICALLY A.R.S. § 41-1051, INDICATING THAT ADMINISTRATIVE RULES SHOULD NOT BE APPROVED BY THE REGULATORY REVIEW COUNCIL UNLESS "THE PROBABLE BENEFITS OF THE RULE OUTWEIGH THE PROBABLE COSTS OF THE RULE"?

A: Yes, I am. Although I understand that the Commission's regulations are not subject to review by the Regulatory Review Council, it is clear that the state has adopted a policy that rules should not be adopted without some reasonable basis to believe that they will be beneficial to the state's citizens. There is no basis contained in the Staff EIS upon which one could draw that conclusion with respect to the Commission's Proposed Rules.

Q: IS IT POSSIBLE TO PREPARE A REASONABLY INFORMATIVE EIS REGARDING THE PROPOSED RULES?

A: Of course. It would require some time and effort by knowledgeable individuals, but it certainly can be done. I have seen privately prepared economic impact analyses regarding retail competition prepared with respect to developments in California, Texas and Louisiana. And I have also seen the massive environmental impact statement prepared by the FERC (which is hundreds of pages long) regarding its competition rule in the transmission area. Without necessarily endorsing the conclusions of these reports, they do demonstrate that policies aimed at changing the heretofore heavily regulated electric utility industry raise concerns about resulting significant and possibly unintended consequences (positive or negative) of substantial financial magnitude that deserve careful attention and scrutiny. Consider, for example, the following:

1. An April 1996 report entitled "Can We Get There From Here? The Challenge of Restructuring The Electric Industry So That We Can All Benefit" concluded, in part, after an intensive analysis of the California electricity market that "Our analysis shows that retail wheeling is more likely to increase total electricity cost to most residential customers." (p. 1-10) I understand the California Legislature has enacted measures to deal with this concern.

2. A report entitled "The Potential Economic Impacts of Retail Competition In The Electric Utility Industry In Texas", dated June 23, 1996 and prepared by Texas Prospectives, Inc. concluded in part that

> Despite all this attention in the last several years, about all that has been conclusively learned thus far about retail competition in the electric utility industry is that it has the potential to be an extremely fractious topic, setting customer class against

> customer class, utility against utility, region against region, state against state. Based on the direction the debate is taking at both the federal and state levels, it does not appear likely that anything approaching the economic model of open competition will be implemented in the near future.
>
> Moreover, it is also not at all apparent that the state of Texas stands to gain that much from retail electricity competition in the short term, making the case for rapid regulatory withdrawal that much less persuasive. (p. 1)

3. An analysis of Louisiana markets reported in the October 3, 1996 *Wall Street Journal* concluded that the price of power for small commercial customers in Louisiana would rise 30% over 7 years in a deregulated competitive market for electricity customers.

The point of these examples is not that retail electric competition in Arizona is necessarily "bad." The point is that decision makers should be fully informed about the consequences of their actions and the real possibility of harm to those people and entities (both public and private) who have made decisions based on a regulatory policy followed by this state for decades.

II.

ANALYSIS OF SELECTED POSSIBLE IMPACTS OF THE COMMISSIONS PROPOSED RULES

Q: HAVE YOU ATTEMPTED TO DETERMINE ANY OF THE POSSIBLE IMPACTS OF THE COMMISSION'S PROPOSED RULES?

A: Yes, I have. I have examined the possible impact of the Proposed Rules on state and local tax revenues resulting from potential electric price reductions, the loss of retail market share by incumbent utilities to other competitors who may not be subject to state taxes and possible generation plant shutdowns. I have also briefly considered the impact of competition on utility line extension policies.

Q: HOW DOES THE STAFF EIS DESCRIBE THE PROPOSED RULES' IMPACT ON STATE REVENUES?

A: The Staff EIS (page 6) states that:

> The proposed rule could reduce state revenues received from public utilities as rates and, therefore, utility revenues are reduced. However to the degree that consumers respond to lower prices by increasing their demand for electricity, the reduction in utility revenues would be offset by additional revenues from increased electricity demands.

Q: DOES STAFF OFFER ANY ANALYSIS OR BACKUP DOCUMENTATION TO SUPPORT THIS "NO IMPACT" VIEW?

A: No. I agree that the Proposed Rules will likely lead to a significant reduction in state tax revenues, absent a significant change to existing tax laws and policy. This will occur both as a result of the hoped for decline in the market price for electricity and from a possible loss of retail market share by incumbent utilities to either non-taxable or less heavily taxed entities. However, there is no reason to believe that, under present laws, this decline in state revenues would be offset in whole, or even in substantial part, by additional revenues from increased electricity demand. Credible studies show that the relevant price elasticity is considerably less than unity (e.g., a dollar decline in electric prices will produce a substantially smaller increase, probably less than 50¢, in electric revenues).

Q: HOW DID YOU CONDUCT YOUR ANALYSIS?

A: I made certain assumptions regarding a decline in electric prices and loss of incumbent utility market share and then calculated the reduction in utility revenues and consequently on tax revenues (from state and local sale taxes, state income taxes and local franchise fees). I then offset this reduction by any increased tax revenues generated by the expected increase in spendable income for consumers and businesses that result from lower electric prices.

Q: WOULD YOU PLEASE EXPLAIN YOUR EVALUATION IN MORE DETAIL?

A: Yes. The state sales tax is applicable to utilities in the business of "producing or furnishing to consumers electricity." The terms "producing" and "furnishing" are not more specifically defined for tax purposes, so the question arises as to whether the various elements of bundled service (i.e., generation, transmission, distribution, ancillary services, metering, billing and collection, etc.) would remain subject to sales tax liability when provided by different suppliers on a "stand alone" (unbundled) basis. For instance, sales that involve title passing out-of-state may possibly altogether avoid Arizona sales tax, because Arizona is prohibited by law from taxing such "foreign" transactions due to Commerce Clause limitations (*e.g.*, a California utility sells power to a Phoenix customer but title passes to the customer beyond the Arizona border, and the customer subsequently arranges for its transmission and distribution to the ultimate consumption point). There are thus at least three ways that sales taxes could be diminished. First, the shifting of generation from retail to wholesale sales; second, the loss of retail sales to entities that are not subject to Arizona sales tax; and third, the reclassification of some unbundled services to a tax "exempt" status under existing law.

It is likely that any substantial revenue loss would also result in a loss of taxable income at the corporate level. This suggests that income taxes will be impacted as well. The year 2003 was selected for analysis because it is the first year of 100% retail choice under the Proposed Rules. Therefore, impacts in earlier years would differ for reasons which include the percent of customers eligible for choice and any difference between market and otherwise regulated prices.

Q: PLEASE DISCUSS THE FIRST ECONOMIC IMPACT YOU ASSESSED.

A: I assessed the impact of a market price that would, on average, be two cents per kilowatt hour (kWh) lower than otherwise. The magnitude of this decline was chosen as a reasonable approximation of the price declines apparently envisioned by at least some proponents of retail competition. To the extent the two cent per kWh is inaccurate, my tax reduction conclusions can be modified accordingly. In other words, a price decline of only one cent per kWh would result in roughly half the impact I have estimated.

APS has provided me information concerning a two cent price reduction scenario taking into account partially offsetting price elasticities (i.e., the extent to which consumption would increase if prices declined) and has calculated an annual revenue loss of $374 million from such a reduction in 2003. That revenue reduction would result in a direct State sales tax reduction of some $18.7 million, a county sales tax reduction of $1.9 million, a local sales tax reduction of $3.7 million, a state income tax reduction of $34.5 million and a franchise fee reduction of $5.6 million. Thus, the total tax impact of that revenue loss is approximately $64.5 million annually. This amount is indicated in Exhibit EDP - 1.

Q: IS THE TOTAL 2003 TAX IMPACT A REDUCTION TO GOVERNMENT ENTITIES OF $64.5 MILLION?

A: No. There are likely some offsets to this. For example, lower prices to residential customers could result in an increase in spendable income for consumers of up to $166 million. Assuming a 90% propensity to consume, the total offset in all taxes would be $13.8 million. The lower market price to commercial and industrial customers, assuming a 25% propensity to consume, would result in an offset of $19.5 million in all taxes. Thus, the net effect of the two cent per kWh reduction would be a sales tax loss of $12.0 million to the state, a county sales tax loss of $1.2 million, a tax loss of $2.4 million at the local level, an income tax loss of $10.0 million at the state level, and a reduction in franchise fees of $5.6 million. The total loss in tax collections would be $31.2 million (before consideration of indirect "multiplier" effects), also displayed in Exhibit EDP - 1.

On the other hand, there are possible effects that could exacerbate tax revenue losses. In addition to a shift in the incidence of revenue receipt from taxable to non-taxable entities (described below), it is likely that governmental entities may attempt to offset their own declining revenues by cutting back purchases or laying off employees.

Under state allocation formulas, significant portions of the state sales tax and state income tax are returned to counties and cities. Because of this, the proportional loss at the local level is really far more significant. After shared revenues are allocated by the state, the state net revenue loss is approximately $18.9 million, while the lost local net revenue is approximately $12.3 million.

Q: COULD STATE REVENUES DECLINE FOR REASONS OTHER THAN A DROP IN THE MARKET PRICE OF ELECTRICITY?

A: Yes. It is not unreasonable to assume that APS (and all investor-owned tax paying utilities) will lose retail market share to competitors not fully subject to Arizona sales, income, use or franchise taxes. Such competitors could include special districts, tribal entities, municipalities and out-of-state public and private utilities. The analysis presented below is predicated on the assumption that APS' retail market share in its current service territory will drop to 60%. Based on events under similar circumstances, this number is not unreasonable to use for estimation purposes. AT&T lost 34% of the long distance telephone market after deregulation despite aggressive marketing campaigns to reacquire lost customers through costly incentive programs. Experiments in New Hampshire with a competitive pilot program resulted in a 70% loss of market share for Public Service of New Hampshire. Given the competitive advantage that many non- or less heavily taxed entities would have under current laws, it is not implausible to believe that the bulk of the loss would be to entities that do not pay some or all taxes in Arizona.

The total effect of such a loss of APS retail market share could be as much as a $616 million revenue reclassification in 2003 that could become non-taxable. This would result in a State sales tax loss in excess of $26.8 million, a county sales tax loss of $3.0 million, a local sales tax loss in excess of $6.4 million, and a loss in franchise fees of $3.3 million for a total tax collection loss of $39.3 million, again displayed in Exhibit EDP - 1.

Thus, the total direct tax effect from a two cent lower market price and a 40% retail market share loss to non-taxable entities would approximate $70.5 million. The indirect and induced tax effects of such a loss (the often called "multiplier" effect), conservatively estimated, would be an additional $49.3 million. Thus, total tax effects based on APS' 65% share of Arizona's taxable retail sales would be $119.8 million.

Grossing up these APS effects to a State of Arizona total by taking into account the other 35 percentage points of the state's taxable utility sales (assuming the same impacts would similarly effect them) indicates a total state revenue loss (after state shared revenues) of $109.7 million and a local revenue loss of $74.6 million for an annual total tax collection loss of $184.3 million. For the five-year period 2003-2007, I estimate the total loss to the state could rise to almost $1 billion ($973 million).

Q: DID YOUR PREVIOUS CALCULATIONS ASSUME ANY LOSS OF UTILITY PROPERTY TAX REVENUES?

A: No, they did not. However, the value of certain kinds of property owned by regulated utilities, such as uneconomic generating plants, may decline as a result of competition. If so, property tax receipts would likewise fall. In Arizona, the value of electric utility property is directly related to book value as determined by FERC accounting conventions. If the value of such property is "written down" or subject to accelerated depreciation under FERC accounting, property tax revenues in Arizona will decrease. However, I did not consider such possible impacts in the calculations just described.

Q: COULD THE PROPOSED RULES PRODUCE OTHER TAX RAMIFICATIONS?

A: Yes. Under a competitive scenario for electricity generation, any power production plant whose marginal operating costs are likely to be substantially higher than its marginal revenues risks closure.

Q: WHAT TYPES OF PLANTS ARE AT RISK FOR CLOSURE?

A: Based on what has happened in other industries that have been deregulated, and based on what has happened to generation capacity in the United Kingdom, it would not be unusual to see uneconomic assets, in terms of generation capacity, being closed down. Plants at risk are those with high variable, but potentially avoidable costs, in such areas as fuel expenses, payroll and property taxes that exceed current market prices, such as coal plants facilities. The APS Cholla plant in Joseph City, Arizona, Tucson Electric Power's Springerville plant and Salt River Project's Coronado facility could someday fall into this category.

In the United Kingdom, as of March 1995, over 8,000 MW of coal and oil generation plants had been shut down as a result of privatization and competition. (Source: NGC Seven Year Statement, March 1995.) Reasons cited included avoidable costs exceeded revenues, age and inefficiency, a surplus of generation plant and a lack of ability to improve plant performance. United Kingdom regulators have reviewed these plant closings and agreed the closing decisions were reasonable (Source: OFFER: 1993).

Q: CAN YOU ILLUSTRATE WHAT WOULD HAPPEN IN THE EVENT OF A PLANT SHUT DOWN?

A: Yes. For illustrative purposes only, I will use the APS Cholla facility because I was readily able to secure useful information on this facility and the surrounding area. However, APS has no plans to close this facility under current market conditions, so this example should be viewed as purely hypothetical. Calculations supporting my discussion are attached as Exhibit EDP-2.

Q: WHAT ARE THE IMPACTS FOR A HYPOTHETICAL CHOLLA SCENARIO?

A: The Cholla plant currently pays property taxes of $12.4 million annually and has payroll of $14.8 million per year. It also causes direct local expenditures of $550,000. Based on these numbers, a hypothetical complete shut down of the facility would decrease sales tax revenues by $800,000. The total local sales tax impact would be roughly $500,000. The state income tax impact would be $1.3 million. Full-time equivalent employment at the plant is approximately 270 employees. Given the indirect and induced "multiplier" effect, the total employment impact would be 783 employees in that local area.

Q: WHAT ABOUT THE IMPACTS ON THE LOCAL COMMUNITIES?

A: The impact of closure would be dramatic, especially in the smaller communities near the plant. Navajo County has total employment of some 26,475 jobs. The loss of jobs because of such a shutdown would be 3% of the county's total. In addition, the unemployment rate, which is 15.5% in the county, would increase to approximately 18%. The immediate area would be more significantly hit. Data is available for Holbrook, Taylor, Snowflake and Winslow. Jobs in those communities total 8,533. The jobs lost could exceed 9% of total employment in those communities with a resulting severe effect on retail sales, resale housing prices and the viability of other businesses as well. These communities would see their fairly high unemployment rate of 7.6% increase to over 16% or to an amount comparable to communities with chronic unemployment problems.

The property tax impact would also be significant. Total primary and secondary property taxes in Navajo County approximate $45.2 million. Property taxes paid for the Cholla plant approximate $12.4 million. Thus, the percent of total Navajo County primary and secondary property taxes coming from the Cholla plant is 27%. While that has significance to both the county and the state in the event of a plant shutdown, local areas would even be harder hit. For example, the plant represents 97% of the full cash value in the Joseph City School District, and 96% of the Joseph City School District's funding comes from local property taxes.

There would also be a large impact due to the loss of the payroll and direct local expenditures. Such losses, after adjusting for state shared revenue, would result in county and local sales tax collections declining by over another 4%.

Although this shut down scenario is purely hypothetical, the risk that some high cost plants will no longer be economically viable under competition is very real. I believe the Commission should recognize and consider such possible impacts in its deliberations over the Proposed Rules.

Q: HAVE THE POTENTIAL REVENUE IMPACTS YOU HAVE JUST DESCRIBED ALSO BEEN MORE BROADLY RECOGNIZED AS A NATIONAL ISSUE?

A: Absolutely. For example, the accounting firm of Deloitte Touche released a report last month entitled "Federal, State and Local Tax Implications of Electric Utility Industry Restructuring". That report recognized that unless existing tax laws are changed, competition is likely to cause state and local tax revenues to decline in many jurisdictions. These declines would result from lower electricity prices, a shift in market share from more to less heavily taxed providers, and declining values of property owned by utilities. The report also recognized that to the extent various providers of electricity are taxed differently under existing law, these differentials will have a very different economic impact in a more competitive environment than they have had under cost of service regulation. The report also notes that the movement of the electric industry toward a more competitive environment creates a number of important policy issues concerning some of the federal income tax rules affecting electric utilities (such as tax normalization requirements, the current deduction for the funding of nuclear decommissioning costs, tax exempt bond financings and the complex tax rules that apply to spin-offs, mergers, acquisitions and other corporate transactions that may occur as part of industry restructuring).

III.

THE MANDATED SOLAR PORTFOLIO

Q: WHAT IS YOUR ASSESSMENT OF THE ECONOMIC IMPACTS OF THE MANDATED SOLAR PORTFOLIO REQUIREMENT?

A: According to APS, compliance with the Proposed Rules' solar resource directive will cost APS approximately $437 million (present value) and raise rates 0.26 cents per kWh. The compliance cost to APS is estimated to be more than $70 million in the year 2003 alone.

That $70 million will come directly out of the spending stream of Arizona consumers and businesses. It acts as a tax, very little of which will be recycled in the local economy. The solar facilities are predominantly fixed cost investments with the majority of the construction purchases coming from out-of-state. Including direct, indirect and induced impacts, the solar portfolio requirement could cause a reduction of up to 1,760 jobs in the Arizona economy.

The goal of improving the environment is a worthy one. I am aware that APS continues to use solar for internal applications where it is cost effective and strongly supports (through research, funding and demonstration projects) the development of solar and other renewable resources for both their potential economic and environmental benefits. The question becomes, however, whether the forced conscription of substantial private capital to subsidize a particular technology is an economically sound public policy. I think not. But if I am wrong, the Commission still should examine whether its mandate will produce any long lasting effects that will benefit the State of Arizona or if there is a better way to spend that much money so that the benefits are more significant, more valuable, and more certain.

Q: BY WAY OF EXAMPLE, ARE THERE ALTERNATIVE USES OF THE FUNDS TO BE "COMMANDEERED" BY THE COMMISSION FOR SOLAR DEVELOPMENT THAT COULD PROVIDE MORE SIGNIFICANT ENVIRONMENTAL OR ECONOMIC BENEFITS TO THE STATE?

A: I am sure there are many. For example:

- According to a November 15, 1996 report by the Alternative Transportation System Task Force, state and local funding of $68 million annually could be spent on a variety of transportation related improvements ranging from "Super Emitter" control measures to bus transit (see EDP Exhibit - 3) that would reduce air pollution from light commercial and passenger vehicles (less than 6,000 lb.) in Maricopa County by 23% and help meet federal clean air standards.

- The same amount of money ($70 million) could retire over 582,000 older vehicles, thereby reducing CO by over 200,000 tons per year and VOC pollutants by over 26,000 tons per year.
- The State could cleanup all 24 State Superfund (WQARF) Sites and thereby greatly reduce risk from contaminated soil and groundwater (estimated cost $392-646 million).

From an economic development standpoint:

- A $7 million subsidy to Sumitomo resulted $400 million in private investment and 900 to 1,000 jobs.
- According to the Greater Phoenix Economic Council, $437 million invested at 8% per annum could train 70,000 workers per year for 40 years.
- $437 million invested at 8% per annum could attract an additional $10 billion in capital investment and $2 billion in additional payroll annually for 40 years.

Q: HOW DOES THE SOLAR MANDATE COMPARE WITH THE ABILITY OF EXISTING CAPACITY TO PRODUCE THE REQUIRED SOLAR RESOURCES?.

A: The total worldwide solar industry has the capacity annually to manufacture roughly 100 megawatts of solar powered generation capacity. APS itself would have to install another 100 megawatts of solar capacity to meet the Proposed Rules. APS needs, therefore, double the worldwide demand for output from that industry for a short period of time. Such a huge increase in demand from APS and other utilities will undoubtedly push up costs dramatically in the short run, causing APS to "pay through the nose." In addition, once that huge "blip" of demand goes through the pipeline, the dearth of demand that follows will certainly cause havoc in that industry.

Q: DOES HISTORY REVEAL ANY LESSONS ON THE SUBSIDIZATION OF SOLAR ENERGY IN ARIZONA?

A: Yes. It is interesting to see what happened in the last experiment with subsidies for solar energy. A tax credit for solar water heaters was enacted in 1984 and 1985 on a federal level. There was a tax credit on the State level as well, but it apparently did not have much of an impact. Based on annual APS surveys, in 1982, 6% of APS desert area customers had solar water heaters. After the federal tax credit was enacted, it went up to 10% and stayed there for a short time after the federal tax credit expired. Once the federal tax credit expired though, the number of houses with solar hot water heaters declined. It appears that solar water heaters without the tax credit were not economically viable and were ultimately replaced by more conventional systems. As of 1994, only 5% of the existing customer base had solar hot water heaters. Also, to my knowledge, there currently are no major home developments installing solar water heaters in the Arizona market. Thus, it appears that the government subsidy failed to produce the intended development and use of solar technology.

Q: WOULD THE SOLAR MANDATE CREATE RESEARCH OR CONSTRUCTION JOBS IN ARIZONA?

A: I doubt it. In essence, utility consumers in the State of Arizona would be subsidizing R&D for the rest of the world and would be receiving very little direct benefit in return. Based upon my reading of the Proposed Rules, solar equipment and technology does not have to be developed or manufactured in Arizona, the solar capacity does not have to be located in Arizona and the solar power does not even have to be delivered to Arizona consumers. Thus, most of the money could be spent out of state.

Q: WILL THE SOLAR REQUIREMENT PROMOTE THE TYPE OF COMPETITION ENVISIONED BY THE PROPOSED RULES?

A: No. There are several reasons why this requirement could, indeed, suppress competition. Arizona is a small enough market so that some suppliers might decide it is not economical to develop the capacity to create a solar portfolio in order to compete in the state. The cost of solar is currently so high that even the cost of purchasing the capacity, rather than building it, would require commitments that the potential new entrant may not wish to make.

Therefore, competitors may stay "on the sidelines" waiting for production prices of solar to collapse. If a competitor does enter the state later, it will probably do so at a far lower cost than will have to be borne by APS and its customers. Overall, relative to others which do not have similar requirements, Arizona will be a more expensive place to operate and, therefore, may be one of the last to see the benefits of competition.

The Proposed Rules could also be interpreted in such a way that APS could be at a permanent cost disadvantage because of the solar portfolio. This is because they will have to add the solar capacity at a significantly higher cost than their competitors. The result is that while both APS and its competitors could have met the rule, APS would have a cost structure that makes it less competitive. In addition, that cost structure puts it at a substantial disadvantage when it tries compete in other states.

Q: DO YOU HAVE ANY CONCLUDING REMARKS ON THE MANDATED SOLAR PORTFOLIO?

A: Like the other substantive provisions of the Proposed Rules, the solar requirement is unsupported by any cost/benefit analysis demonstrating that it makes sense for Arizona. I believe the requirement will be an anti-competitive and costly burden on Arizona utilities and their customers that will not produce measurable environmental benefits for this State.

IV.

NEW SERVICE CONNECT FEES

Q: DO YOU SEE ANY OTHER UNINTENDED CONSEQUENCES FROM THE PROPOSED RULE?

A: Yes. From my many years as an economist in Arizona, I have seen the inherent difficulty in maintaining subsidies or artificial rules (e.g., tax laws) in highly competitive services. Those who argue that subsidies, government programs and the like can successfully accomplish their salutary objectives are just fooling themselves and those who listen to them. The reality is that generation competitors will seek advantage in any way possible. For this reason, APS will need to eliminate existing subsidies in a number of areas including new customer hook-ups.

Specifically the economics of line extensions will have to be modified to reflect the following characteristics of service:

- partial requirements
- wire-only business
- uncertainty of future service

These characteristics will, in turn, dictate that:

1. revenues to support extensions will be derived from services provided (i.e. wires only, because generation revenues will not be available to support local construction costs).
2. extension costs will be based on incremental costs to serve without consideration of inter-class subsidies.
3. capital costs will be based on competitive market rates and shorter paybacks.
4. modification or elimination of footage basis and revenue basis will be required.
5. increased customer contributions will be required.
6. increased advances by builders will be required.

To provide a specific example, APS estimates that new service costs could be about $4,000 above what the revenues per home would justify for homes built in predominantly rural and sparsely populated suburban areas. APS further estimates roughly 1,500 new homes per year with average service extensions of 560 feet in the subsidy category. This is about 10% of the annual new home growth in APS' service territory. The total amount of this subsidy is $6.0 million per year charged to new hook-ups. If this subsidy is abruptly eliminated, the Commission should prepare itself for an onslaught of complaints from home builders and affected customers.

Q: IS $4,000 THE BUILDER'S TOTAL AVERAGE IMPACT?

A: No. In reality, this additional connection fee will increase the price of a home considerably more than the $4,000 itself. A home builder will have to pay interest and points to borrow the $4,000 during the construction period, pay increased sales taxes because the price of the home would be higher and mark-up the costs to get the return on the total cost of the home that the builder's investors demand. This is standard practice in the home building industry.

Thus, that increased fee of $4,000 could result in a house price increase of $6,000 to $6,800. An $6,400 increase in the house price, if financed at 8.0% over 30 years would result in house payment increase of $46.96 per month or some $564 per year. If the homeowner spends one-quarter of his income for the price of a home, a person's income would have to be $2,250 higher annually in order to qualify for the same home because of the one time $4,000 new service fee.

V.

CONCLUSION

Q: DO YOU HAVE ANY CONCLUDING REMARKS?

A: Yes. The competition envisioned by the Commission in the Proposed Rules will provide some benefits to certain segments of Arizona, as competition does in other industries. However, the evaluation of what those benefits will be, when they will occur, who will be the beneficiaries and who will be "losers" is a complex but necessary undertaking that should be completed before the Commission reaches its final decision. Unfortunately, the Staff EIS fails to offer any meaningful assistance to the Commission, to the utilities it regulates and to the general public. At a minimum, I would urge the Commission to have a comprehensive and complete assessment prepared as soon as possible. I would also specifically hope that the potential "costs" associated with competition and the Commission's Proposed Rules are identified, evaluated and mitigated to the extent possible so that the resulting final action creates a better Arizona.

Q: DOES THIS COMPLETE YOUR TESTIMONY?

A: Yes.

PROJECTED ECONOMIC IMPACTS OF ACC PROPOSED RULE ON APS AND ARIZONA FOR THE YEAR 2003: LOWER PRICE AND RETAIL MARKET SHARE LOSS

		TAX COLLECTIONS						TAXES AS RECEIVED		
		SALES TAXES ($ M)								
	APS REVENUE ($ M)	STATE	COUNTY	LOCAL	STATE INCOME TAX ($ M)	FRANCHISE FEES ($ M)	TOTAL ($ M)	STATE ($ M)	LOCAL ($ M)	TOTAL ($ M)
1. LOWER MARKET CLEARING PRICE										
1.(A) Two cents per KWH price reduction OFFSET BY:	$ (374.00)	$ (18.70)	$ (1.87)	$ (3.74)	$ (34.51)	$ (5.63)	$ (64.45)	$ (45.59)	$ (18.87)	$ (64.45)
1.(B) 44.4% of lower market price is to residential customers	$ (166.06)	$ 4.77	$ 0.48	$ 0.95	$ 7.57	-	$ 13.77	$ 10.58	$ 3.19	$ 13.77
1.(C) 55.6% of lower market price is to commercial and industrial customers	$ (207.94)	$ 1.95	$ 0.19	$ 0.39	$ 16.96	-	$ 19.49	$ 16.11	$ 3.38	$ 19.49
1.(D) Total direct tax impact of lower market price		$ (11.98)	$ (1.20)	$ (2.40)	$ (9.99)	$ (5.63)	$ (31.19)	$ (18.90)	$ (12.29)	$ (31.19)
2. LOSS OF RETAIL MARKET SHARE TO NON-TAXABLE ENTITIES RESULTS IN RECLASSIFICATION OF APS' WHOLESALE REVENUES										
2.(A) Loss of 40 % retail market share: Generation	$ 220.07	$ (8.03)	$ (1.10)	$ (1.93)	$ 0.30	$ (3.30)	$ (14.06)	$ (6.73)	$ (7.34)	$ (14.07)
2.(B) Reclassification of Transmission & Distribution revenues (40%)	$ 385.87	$ (18.78)	$ (1.93)	$ (4.51)	-	-	$ (25.22)	$ (16.32)	$ (8.90)	$ (25.22)
2.(C) Total direct tax impact of APS' 40% loss retail market share		$ (26.81)	$ (3.03)	$ (6.44)	$ 0.23	$ (3.30)	$ (39.28)	$ (23.05)	$ (16.24)	$ (39.29)
3. DIRECT TAX IMPACTS (TOTAL of 1.(D) and 2.(C))		$ (38.79)	$ (4.23)	$ (8.84)	$ (9.69)	$ (8.93)	$ (70.47)	$ (41.94)	$ (28.53)	$ (70.47)
4. INDIRECT AND INDUCED TAX IMPACTS (MULTIPLY LINE 3 BY 0.7)		$ (27.15)	$ (2.96)	$ (6.19)	$ (6.78)	$ (6.25)	$ (49.33)	$ (29.36)	$ (19.97)	$ (49.33)
5. TAX IMPACTS OF APS' 65% SHARE OF TAXABLE UTILITY SALES (LINES 3+4)		$ (65.94)	$ (7.19)	$(15.02)	$ (16.47)	$ (15.18)	$ (119.80)	$ (71.31)	$ (48.50)	$ (119.80)
6. ARIZONA TAX IMPACTS OF 100% TAXABLE UTILITY SALES (DIVIDE LINE 5 BY .65)		**$(101.45)**	**$(11.06)**	**$(23.11)**	**$ (25.34)**	**$ (23.36)**	**$ (184.32)**	**$ (109.70)**	**$ (74.62)**	**$ (184.32)**

NOTES:

1. Tax rates: (A) State sales tax, 5%; (B) County sales tax, 0.5%; (C) Local sales tax, 1.0%; (D) State income tax, 9%; (E) Franchise Fee, 1.5%. These rates were used when more accurate data was not available.
2. Market clearing price revenue reduction of ($374M) includes an $81.6M revenue increase from increased sales (price elasticity and out-of-arizona sales increases)
3. The direct tax impacts (line 3) reflect APS' 65% share of affected utilities sales.
4. The franchise fees are technically not a reduction in franchise fees, but rather a further reduction in sales tax revenues.

IMPACT OF CHOLLA PLANT SHUT DOWN SCENARIO ($ Millions)

DIRECT PROPERTY TAX IMPACT (1996)	**($12.4)**
DIRECT PAYROLL IMPACT (1995)	**($14.8)**
DIRECT LOCAL EXPENDITURES (1995)	**($0.6)**
SALES TAX IMPACT:	
STATE	**($0.8)**
LOCAL	**($0.5)**
STATE INCOME TAXES	**($1.3)**
TOTAL JOBS IMPACTED	**(783)**

% REDUCTION IN LOCAL SALES TAX COLLECTIONS IN NAVAJO COUNTY

(4.1%)

% REDUCTION IN EMPLOYMENT IN NAVAJO COUNTY DUE TO SHUT DOWN

(3.0%)

% UNEMPLOYMENT IN NAVAJO COUNTY AFTER SHUT DOWN

18.0%

% OF TOTAL NAVAJO PRIMARY & SECONDARY PROPERTY TAXES PAID BY CHOLLA PLANT

27.4%

% OF JOSEPH CITY SCHOOL DISTRICT BUDGET FUNDED BY PROPERTY TAXES

96%

% OF FULL CASH VALUE IN JOSEPH CITY SCHOOL DISTRICT REPRESENTED BY CHOLLA PLANT

97.2%

IMPACT OF CHOLLA PLANT SHUT DOWN SCENARIO ($ Millions)

TOTAL JOBS IMPACT	
CHOLLA FULL TIME EQUIVALENT EMPLOYEES	270
NAVAJO COUNTY EMPLOYMENT MULTIPLIER	2.9
TOTAL JOBS IMPACTED	**783**

EMPLOYMENT AND UNEMPLOYMENT RATES IN AFFECTED COMMUNITIES

	TOTAL JOBS	UNEMPLOYMENT RATE
NAVAJO COUNTY	26475	15.5%
SHUT DOWN JOB LOSS AS % OF TOTAL	**3.0%**	
UNEMPLOYMENT RATE-AFTER SHUT DOWN		**18.0%**
AFFECTED COMMUNITIES		
HOLBROOK	2409	8.1%
TAYLOR	1014	5.8%
SNOWFLAKE	1324	6.6%
WINSLOW	3786	9.1%
	8533	7.6%
SHUT DOWN JOB LOSS AS % OF TOTAL	**9.2%**	
UNEMPLOYMENT RATE-SHUT DOWN		**16.1%**

NOTE:

1) EMPLOYMENT & UNEMPLOYMENT RATES ARE AVERAGES FOR THE FIRST EIGHT MONTHS OF 1996.
SOURCE: ARIZONA DEPARTMENT OF ECONOMIC SECURITY

2) FULL TIME EQUIVALENT EMPLOYEES PROVIDED BY ARIZONA PUBLIC SERVICE.
EMPLOYMENT MULTIPLIER-UNIVERSITY OF ARIZONA ECONOMIC MODEL OF ARIZONA, VALLEY NATIONAL BANK ECONOMETRIC MODEL OF THE STATE OF ARIZONA; MULTIPLIER ANALYSIS OF ARIZONA & ITS SUBSTATE AREAS BY CHARNEY & TAYLOR, ARIZONA REVIEW (UNIVERSITY OF ARIZONA)

3) SHUT DOWN JOB LOSS AS % OF TOTAL IS TOTAL JOBS LOST DIVIDED BY PRESENT TOTAL JOBS.

4) UNEMPLOYMENT RATE-AFTER SHUT DOWN ASSUMES THAT JOBS ARE LOST FROM LOCAL AREA & THAT THOSE PEOPLE REMAINING IN THE AREA ARE LOOKING FOR EMPLOYMENT.

IMPACT OF CHOLLA PLANT SHUT DOWN SCENARIO ($ Millions)

IMPACT OF PROPERTY TAX

Property taxes paid by Cholla plant	($12.4)
Indirect & induced impacts	($8.7)
Total impact of property tax	($21.1)

		SALES TAXES			STATE
		STATE	COUNTY	LOCAL	INCOME TAX
INDIRECT & INDUCED IMPACTS	($8.7)				($0.4)
48.1% spent on taxable goods	($4.2)	($0.2)	($0.0)	($0.04)	
Local tax impact after state shared revenues		($0.2)	($0.04)	($0.05)	($0.3)

SUMMARY

TOTAL IMPACT OF CHOLLA PLANT PROPERTY TAXES

DIRECT PROPERTY TAX IMPACT (1996)	($12.4)
DIRECT, INDIRECT & INDUCED IMPACTS	($21.1)
SALES TAX IMPACT:	
STATE	($0.2)
LOCAL (COUNTY & CITIES/TOWNS)	($0.1)
STATE INCOME TAX IMPACT	($0.3)

PRIMARY & SECONDARY PROPERTY TAXES COLLECTED IN NAVAJO COUNTY-1996 ($ Millions)

PRIMARY	$33.8
SECONDARY	$11.5
	$45.3
PROPERTY TAXES PAID FOR CHOLLA	$12.4

% OF TOTAL NAVAJO PRIMARY & SECONDARY PROPERTY TAXES PAID BY APS FOR CHOLLA PLANT

27.4%

NOTES:

1) PROPERTY TAXES PAID-ARIZONA PUBLIC SERVICE

2) PRIMARY & SECONDARY PROPERTY TAX DATA FROM ARIZONA DEPT. OF REVENUE 1995 ANNUAL REPORT (PG... 50-51)

3) INCOME MULTIPLIER-UNIVERSITY OF ARIZONA ECONOMIC MODEL OF ARIZONA MULTIPLIER ANALYSIS OF ARIZONA & ITS SUBSTATE AREAS BY CHARNEY & TAYLOR, ARIZONA REVIEW (UNIVERSITY OF ARIZONA), FALL 1985. *ECONOMIC IMPACT STUDY* OF A MAJOR LEAGUE BASEBALL STADIUM & FRANCHISE, DELOITTE, TOUCHE, TOHMATSU INTERNATIONAL, DECEMBER, 1993.

4) PROPERTY TAX IMPACT EFFECTS PROPERTY TAX PAYMENTS. INDIRECT & INDUCED IMPACTS ARE ASSUMED TO BE SPENDING BY THOSE WHO RECEIVE GOVERNMENT FUNDS.

5) 48.1% OF CONSUMER INCOME SPENT ON RETAIL TAXABLE ITEMS PER 1993-94 CONSUMER EXPENDITURE SURVEY, U. S. DEPARTMENT OF COMMERCE, BUREAU OF LABOR STATISTICS.

6) FOR STATE INCOME TAX PURPOSES, IT IS ASSUMED THAT 50% OF SPENDING IS FOR SERVICES AND 50% IS FOR GOODS. FOR THE GOODS PORTION, COST OF GOODS SOLD IS ASSUMED TO BE 50%. GROSS PROFIT ON THE GOODS IS ASSUMED TO GO 50% FOR PAYROLL & 50% FOR PROFIT FOR THE SERVICES PORTION, 75% GOES TO PAYROLL & 25% TO PROFIT.

7) ECONOMIC THEORY SUGGESTS THAT CHOLLA WOULD BE SHUT DOWN IF THE MARGINAL COSTS OF OPERATION EXCEEDED THE MARGINAL REVENUES FOR THE FORSEEABLE FUTURE. THE CAPACITY LOST AT CHOLLA WOULD BE MADE UP BY OTHER CAPACITY IN THE APS SYSTEM OR BY THE PURCHASE OF ENERGY FROM ANOTHER UTILITY.

8) MARGINAL COSTS INCLUDE FUEL COSTS, PROPERTY TAXES, PAYROLL AND MISCELLANEOUS OTHER OPERATING EXPENSES.

9) TAX RATES USED: STATE INCOME TAXES-CORPORATE 9% INDIVIDUAL 4.5%
STATE SALES TAX RATE - 5%
COUNTY SALES TAX RATE - 0.5%
CITY/TOWN SALES TAX RATE - 1.0%

IMPACT OF CHOLLA PLANT SHUT DOWN SCENARIO ($ Millions)

		SALES TAXES			STATE INCOME
TOTAL IMPACT OF PAYROLL @ CHOLLA PLANT		STATE	COUNTY	LOCAL	TAXES
Total payroll	($14.8)	($0.4)	($0.0)	($0.1)	($0.7)
Indirect & induced impacts	($10.4)	($0.2)	($0.0)	($0.0)	($0.5)
Total impact of payroll	($25.2)	($0.6)	($0.1)	($0.1)	($1.1)
Local tax Impact after state shared revenues		**($0.5)**	**($0.1)**	**($0.3)**	**($1.0)**

SUMMARY

TOTAL IMPACT OF PAYROLL @ CHOLLA PLANT	
DIRECT PAYROLL IMPACT (1995)	($14.8)
DIRECT, INDIRECT & INDUCED	($25.2)
SALES TAX IMPACT:	
STATE	($0.5)
LOCAL (CITY & COUNTY)	($0.4)
STATE INCOME TAXES	($1.0)
TOTAL SALES TAXES COLLECTED IN NAVAJO COUNTY 1995-96	$13.2

NOTES:

1) DIRECT PAYROLL PAID-ARIZONA PUBLIC SERVICE.

2) INCOME MULTIPLIER-UNIVERSITY OF ARIZONA ECONOMIC MODEL OF ARIZONA MULTIPLIER ANALYSIS OF ARIZONA & ITS SUBSTATE AREAS BY CHARNEY & TAYLOR, ARIZONA REVIEW (UNIVERSITY OF ARIZONA), FALL 1985. ECONOMIC IMPACT STUDY OF A MAJOR LEAGUE BASEBALL STADIUM & FRANCHISE, DELOITTE, TOUCHE, TOHMATSU INTERNATIONAL, DECEMBER, 1993.

3) 48.1% OF CONSUMER INCOME SPENT ON RETAIL TAXABLE ITEMS PER 1993-1994 CONSUMER EXPENDITURE SURVEY, U. S. DEPARTMENT OF COMMERCE, BUREAU OF LABOR STATISTICS.

4) FOR STATE INCOME TAX PURPOSES, IT IS REASONABLE TO ASSUME THAT 50% OF SPENDING IS FOR SERVICES AND 50% IS FOR GOODS. FOR THE GOODS PORTION, COST OF GOODS SOLD IS ASSUMED TO BE 50%. GROSS PROFIT ON THE GOODS IS ASSUMED TO GO 50% FOR PAYROLL & 50% FOR PROFIT FOR THE SERVICES PORTION, 75% GOES TO PAYROLL & 25% TO PROFIT.

5) STATE SHARED REVENUES-STATE SALES TAXES: 86.9% TO GENERAL FUND: 8.1% TO COUNTY: 5% TO CITIES/TOWNS
STATE INCOME TAXES: 15% TO CITIES & TOWNS WITH A TWO YEAR LAG
SOURCE: GEORGANNA MEYER, THE ARIZONA DEPARTMENT OF REVENUE

6) TAX RATES USED: STATE INCOME TAXES-CORPORATE 9% INDIVIDUAL 4.5%
STATE SALES TAX RATE - 5%
COUNTY SALES TAX RATE - 0.5%
CITY/TOWN SALES TAX RATE - 1.0%

7) MUNICIPAL & COUNTY SALES TAX COLLECTIONS 1995-1996 FROM ARIZONA DEPT. OF REVENUE ANNUAL REPORT PG. 8 & 30.

IMPACT OF CHOLLA PLANT SHUT DOWN SCENARIO ($ Millions)

		SALES TAXES			STATE INCOME
TOTAL IMPACT OF LOCAL EXPENDITURES		STATE	COUNTY	LOCAL	TAXES
Total local expenditures	($0.55)	($0.01)	($0.00)	($0.00)	($0.02)
Indirect & induced impacts	($0.39)	($0.01)	($0.00)	($0.00)	($0.02)
Total impact of local expenditures	($0.94)	($0.02)	($0.00)	($0.00)	($0.04)
Local tax Impact after state shared revenues		**($0.02)**	**($0.00)**	**($0.01)**	**($0.04)**

SUMMARY

TOTAL IMPACT OF LOCAL EXPENDITURES	
DIRECT OTHER LOCAL SPENDING IMPACT	($0.55)
DIRECT, INDIRECT & INDUCED	($0.94)
SALES TAX IMPACT:	
STATE	($0.02)
LOCAL (COUNTY & CITIES/TOWNS)	($0.02)
STATE INCOME TAXES	($0.04)

NOTES:

1) LOCAL EXPENDITURES-ARIZONA PUBLIC SERVICE

2) INCOME MULTIPLIER-UNIVERSITY OF ARIZONA ECONOMIC MODEL OF ARIZONA MULTIPLIER ANALYSIS OF ARIZONA & ITS SUBSTATE AREAS BY CHARNEY & TAYLOR, ARIZONA REVIEW (UNIVERSITY OF ARIZONA), FALL 1985. ECONOMIC IMPACT STUDY OF A MAJOR LEAGUE BASEBALL STADIUM & FRANCHISE, DELOITTE, TOUCHE, TOHMATSU INTERNATIONAL, DECEMBER, 1993.

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5) STATE SHARED REVENUES-STATE SALES TAXES: 86.9% TO GENERAL FUND: 8.1% TO COUNTY: 5% TO CITIES/TOWNS
STATE INCOME TAXES: 15% TO CITIES & TOWNS WITH A TWO YEAR LAG
SOURCE: GEORGANNA MEYER, THE ARIZONA DEPARTMENT OF REVENUE

6) TAX RATES USED: STATE INCOME TAXES-CORPORATE 9% INDIVIDUAL 4.5%
STATE SALES TAX RATE - 5%
COUNTY SALES TAX RATE - 0.5%
CITY/TOWN SALES TAX RATE - 1.0%

TABLE S-3

Summary Of Implementation Costs And Funding Needs (000's of 1996$)

Alternatives To Improve Automobile Travel (1)			
Program Element	**Estimated Total Annual Public Cost (2)**	**Potential Funding Sources**	**State/Local Annual Funds Needed (3)**
Vehicle Licensing Surcharge/Tax Incentive (4)	$595	ADOT "seed" funding (HURF)	$595
"Super Emitter" Measures (4)			
• Emissions Fees	$198	ADOT "seed" funding (HURF)	$198
• Accelerated Vehicle Retirement	$2,000	State HURF and General Fund (e.g., sales tax, income tax, etc.)	$2,000
• Catalytic Converter Conversion	$400	State General Fund (tax credits); VLT surcharge; private funds	$400
HOV Lane Pricing	$6,495	FHWA demonstration funds; ADOT capital program, private funds	$6,495
Alt. Fuels Conversion – Gov. Fleet	$150	Local and State agency funds	$150
Wide-area Signal Synchronization	$3,289	HURF funds (State and local)	$3,289
Grand Avenue Congestion Relief	$3,962	ADOT capital program reallocation (HURF); federal funds	$3,962
Subtotal	$17,089		$17,089

Alternative Transportation Modes (1)				
	Estimated Total Annual Public Cost (2)	**Sources of Funding**		**State/Local Annual Funds Needed (3)**
Program Element		**Federal**	**Farebox**	
Moderate Bus and Dial-a-Ride	$69,000	$13,500	$10,500	$45,000
Carpooling	$3,500	-	-	$3,500
Vanpooling	$550	$275	-	$275
Alternate Work Schedules	$600	-	-	$600
Bicycle/Pedestrian	$1,000	-	-	$1,000
Tele-commuting	$700	-	-	$700
Subtotal	$75,350	$13,775	$11,223	$51,075
Total				$68,164

NOTES:

(1) Refer to Appendices B and C for details regarding the actions proposed and the assumptions behind each of these alternatives.

(2) This calculation does not include public revenues or private costs and/or benefits resulting from the measure's implementation (e.g., HOV lane pricing revenues, higher vehicle registration fees for some drivers, gains in economic productivity, reduced traffic accidents, etc.).

(3) Estimated State/Local Annual Funds Needed represent only the funds necessary to implement the recommendations of the Task Force. Total of approximately $68 million does not include the one-time cost of $10 million recommended as the State's support for local efforts to study, design, and implement fixed-guideway transit service.

(4) The cost of implementing these measures is different than the costs shown on Table S-2, because the Task Force assumed that each measure would only be partially implemented in conjunction with the others. Although these four measures would be simultaneously implemented for cost estimation purposes, the resulting pollution reduction impacts would not be cumulative.

BIOGRAPHY FOR ELLIOTT D. POLLACK

Elliott D. Pollack is president of Elliott D. Pollack and Company, an economic and real estate consulting firm. Elliott D. Pollack and Company provides consultation on all aspects of the Arizona economy.

For 14 years, Mr. Pollack served as Chief Economist of Valley National Bank of Arizona. He was responsible for Valley National Bank's asset/liability model and for the state and national econometric model which he built and implemented. He was responsible for local, state and national economic forecasting to the Board of Directors, customers, business, industry and analysts. Mr. Pollack was editor of Valley National Bank's monthly economic publication "Arizona Progress" and the annual "Arizona Statistical Review".

Widely quoted by local, state, regional and national media, Mr. Pollack's credentials are extensive. He is a Chartered Financial Analyst, a member of the Institute for Investment Management, Arizona Economic Round Table, National Association of Business Economists, Economic Estimates Commission, Joint Legislative Budget Advisory Committee, State Treasurer's Advisory Committee, the Phoenix Commission on the Economy, and CityShape 2020 (the advisory team for the City of Scottsdale). He is a consulting economist at Arizona State University, an editor of "Arizona Blue Chip Economic Forecast" and "Greater Phoenix Blue Chip Economic Forecast." Mr. Pollack is also a member of the American Society of Real Estate Counselors and a licensed real estate broker.

He has been a keynote speaker for numerous national conventions and university luncheons. Mr. Pollack has also served on the Board of Directors and the Advisory Board of Sun State Savings and Loan. He has served on a local Advisory Board to the Resolution Trust Corporation. He was also Chair to the City of Phoenix Ad Hoc Committee on Resolution Trust Corporation Affairs. He is currently on the Board of Directors for the Phoenix Chamber of Commerce.

Elliott D. Pollack and Company produces the Greater Phoenix by the Numbers data book.

Mr. Pollack earned a Bachelor of Science in Accounting from Boston University in 1967 and a Masters in Business Administration from University of Southern California in 1968. He has served on the Board of Directors of numerous civic, community and cultural organizations.

Studies Conducted by Elliott D. Pollack and Company

Economic Impact of Downtown Hotel in the City of Phoenix, Arizona (1996)
This study prepared for the Phoenix & Valley of the Sun Convention & Visitors Bureau estimated the economic and fiscal impact to the City of Phoenix of a new 650 room hotel. The analysis estimated the amount of tax revenue which would be generated to the City over a period of seven years in support of potential incentives granted to the hotel developer.

Economic and Fiscal Impact of the Hayden Ferry Portion of the Tempe Rio Salado Project (1996)
This study estimated the economic and fiscal impact of a hotel, retail, office, and residential project to be located along the south side of the Salt River in downtown Tempe.

Economic and Fiscal Impact of the Multihousing Industry on the State of Arizona, Maricopa County and Pima County (1996)
Commissioned by the Arizona Multihousing Association, this study will determine the impact of the multi-family housing market on the economy of the State and its two largest counties. The analysis will also outline the fiscal impact of the industry on local communities from the various revenue sources including taxes, State shared revenues, and fees.

Economic and Fiscal Impact of Proposed Sustainable Growth Ordinance, Sedona, Arizona (1996)
This study evaluated the potential impact of a proposed growth management initiative proposed by citizen groups in Sedona.

Phoenix-Scottsdale Shared Revenue Zone (1994-1996)
Elliott D. Pollack and Company undertook this demographic study of the North Phoenix and North Scottsdale area to estimate the future demand for regional commercial facilities. The study analyzed population growth rates, income levels and spending patterns of the future north area population, with Scottsdale and Phoenix sharing revenues generated from regional retail uses.

Economic and Market Analysis for Horseman's Park, Scottsdale, Arizona (1996)
This study looked at the economic and market conditions which effect the master planning and development of a 320 acre site in north Scottsdale.

Fiscal Impact and Retail Market Analysis for Retail Site at the Southwest Corner of Scottsdale Road and Dynamite Boulevard, Scottsdale, Arizona (1996)
This study evaluated market demand for this 36 acre retail site and the resulting fiscal impact to the City of Scottsdale from its future development.

Valley Partnership Position Papers (1996)
Preparation of position papers which discuss various land use and quality of life issues facing metro Phoenix.

Greater Phoenix By The Numbers (1992, 1993, 1994, 1995, 1996)
This statistical compendium of data regarding the Greater Phoenix area is published by the company for the Greater Phoenix Economic Council.

City of Mesa General Plan Update - Economic Development Element (1995)
Elliott D. Pollack and Company is part of the project team undertaking a comprehensive update of the Mesa General Plan. The firm is responsible for the economic base analysis of the City and establishing economic development strategies. The company developed demand projections for residential, commercial, and industrial land uses to estimate the amount of land expected to be absorbed in the future.

Fiscal Impact and Supply/Demand Analysis for Grand Marketplace Power Center, Sun City West (1995)
This project, commissioned for Del Webb, evaluated the demand for and fiscal impact of a 400,000 square foot power center in Sun City West.

Salt River Pima-Maricopa Indian Community Gaming Study (1994)
Study Update (1995)
Elliott D. Pollack and Company and Behavior Research Center, Inc. prepared this study which addressed the gaming patterns of local residents and tourists and projected the economic impact of a casino on the Salt River Pima-Maricopa Reservation.

Williams Gateway Airport Strategic Economic Development Plan and Commercial/Industrial Master Plan (1994)
As part of the consultant team undertaking these studies for the former Williams Air Force Base, the company is responsible for analysis of the regional economy and real estate market, with particular emphases on the industrial subsector and competing airports in Maricopa County. The project, when completed, will provide a long term strategic plan for the marketing and future development of Williams.

Economic Impact Analysis of Proposed Assured Water Supply Rules (1993)
Under contract with the Arizona Department of Water Resources, the firm evaluated the impact of enacting new water supply rules. The project involved econometric modeling of the impact of higher domestic water rates on all AMAs within the State.

Economic Assets of Greater Phoenix (1993)
This publication, developed for Salt River Project, is used for marketing and company recruitment purposes and contains a wide variety of economic and demographic information.

Economic Impact of the Reuse of Williams Air Force Base, Salt River Project (1992) and
Economic Impact of Closure and Re-Use of Williams Air Force Base on Chandler Airport, Salt River Project (1992)
The company recently completed these two studies commissioned by Salt River Project concerning the potential economic impact of the re-use of Williams Air Force Base. These studies analyzed historic growth patterns in the Southeast Valley and projected how growth and development would be affected by the re-use of the Base. Factors analyzed included housing starts, population, retail sales, indirect employment, sales tax, and property tax. Economic impacts were broken down by municipality to help SRP estimate the future extent and location of electric demand.

Retail/Office Market Study for Fountain Hills, Arizona (1992)
The study analyzed the demand for retail and office space in Fountain Hills and the competitive supply.

Enrollment Projection Study, Scottsdale Unified School District (1992)
This project provided short and long term enrollment projections for the School District, evaluating explosive growth in the northern portion of the District and the slower growing population in the established southern portion. Projections were provided for each elementary, middle, and high school on an intermediate and long term basis.

Feasibility Analysis of Estrella and Hidden Valley Master-Planned Communities, Goodyear, Arizona (1992)
This study, commissioned by a potential purchaser of the property, evaluated the feasibility of purchasing and further developing the project. The study required extensive review of Lincoln Savings files, master plans, engineering documents, construction estimates, and development agreements.

Feasibility Analysis of Rose Garden Trails, Arizona State Land Department (1992)
The Arizona State Land Department hired Elliott D. Pollack and Company to evaluate the economic feasibility of this 127 acre site located in the Deer Valley area of Phoenix. The project involved the evaluation of the approved development plan, the competitive real estate market, and other factors affecting marketing and disposition of the property.

Feasibility Analysis of the Stetson Hills Project, Arizona State Land Department (1992)
The Arizona State Land Department hired Elliott D. Pollack and Company to evaluate the economic feasibility of this 2,200 acre master planned project in North Phoenix. The project involved evaluation of the master plan, the competitive real estate market and phasing of improvements. The Company recommended methods for marketing and disposition of one of the largest projects in the Department's portfolio.

Projections of Real Estate Market Recovery - Maricopa and Pima Counties (1992)
The Company undertook a comprehensive analysis of all sectors to the Maricopa County and Pima County real estate markets to determine the expected timing of correction based on historical and projected growth patterns. The study also included evaluation of approximately 80 real estate assets to recommend strategies for maximizing the portfolio value and timing of disposition.

Financial Feasibility of Acquisition of 100,000 Square Foot Office Building (1992)
This study assessed the feasibility of acquisition of the office building based on existing market conditions and absorption rates, current and projected lease rates, and expected timing of recovery of the office subsector. Recommendations were provided on the terms of acquisition, leasing rates and terms, and marketing strategies.

Retail Market Study for Northeast Scottsdale (1991)
This market study evaluated the supply and demand characteristics for retail shopping center space for the area surrounding the intersection of Pima Road and Shea Boulevard.

Real Estate Value Appreciation Model (1991)
The Company developed a model for Maricopa County to evaluate alternative land use strategies and economic feasibility. The model incorporated actual, comparable transactions and economic events such as real estate market liquidity and building activity to estimate appreciation rates. It also examined master planned communities to determine the timing of appreciation relative to their life cycle stage.

BARKER

BEFORE THE

ARIZONA CORPORATION COMMISSION

DOCKET NO. R-0000-94-165

TESTIMONY

OF

JAMES V. BARKER, JR.

ON BEHALF OF

ARIZONA PUBLIC SERVICE COMPANY

NOVEMBER 27, 1996

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APPENDIX 1

Testimony on Reliability Issues as Related to Retail Competition

I. QUALIFICATIONS

Q. Please state your name and business address.

A. My name is James V. Barker, Jr. and my business address is 4400 Fair Lakes Court, Fairfax, Virginia, 22033.

Q. What is your current position?

A. I am Vice President of Management Consulting Services of KEMA-ECC, Inc.

Q. Please outline your educational background.

A. I received a B.S. degree in Electrical Engineering from Virginia Polytechnic Institute and State University in 1963.

Q. Where were you employed after leaving Virginia Tech?

A. I worked for Potomac Electric Power Company for eleven years, served in the U. S. Army for two years, and the U. S. Government (Federal Energy Administration and the Department of Energy) for six years. I then joined ECC, Inc. in 1981.

Q. What has been your dominant area of specialization.

A. Since 1978, my primary focus has been the area of bulk power trading. I was responsible for the Federal Government's program to promote interconnection and trading under Section 202a of the Federal Power Act. Beginning in 1982, I conducted a number of seminars on the practical aspects of developing and implementing bulk power trading strategies. I have also had hands-on experience in many aspects of the design, implementation, and operation of power pools. Since 1988, my primary efforts have been in the area of implementation of open access markets and electric industry restructure. A large amount of this work has been outside of the U. S. A copy of my resume is Appendix 1 to this testimony.

Q. What experience have you had with the design and implementation of competitive markets?

A. I was extensively involved in the implementation of the competitive market in England and Wales. This began in early 1988, when I reviewed the capabilities of a proposed energy management system to monitor and control the entire England and Wales transmission network to insure its compatibility with the proposed electricity market. Next, I was asked to review existing pool settlement systems to determine if any might be capable of being used for the England and Wales power pool. Following these two activities, I was engaged to assist the National Grid Company (NGC) in the development of contractual arrangements and operational rules. Most of my time from the fall of 1988 to the spring of 1990, when the new structure was put into operation, was spent in England. In addition to directing associates who were directly involved in day-by-day development of the settlement system operation and pool agreement, the operational rules (the NGC Grid Code), the Ancillary Service Business, and negotiation of the entire set of contractual arrangements; I personally:

a) assisted in negotiation of the settlement agreement

b) advised on development of the Grid Code

c) designed the full time organizational structure for development of the Grid Code, the NGC Grid Code Task Force, on which an associate was assigned to full time participation

d) assisted NGC's Board Member who was responsible for creating a Commercial Department by monitoring and coordinating settlement system negotiations and implementation, transmission tariff (Connection and Use of System Agreement) design, ancillary services agreement development, and interconnection agreements with Scotland and France

e) represented the Commercial Department on the internal NGC Grid Code Coordination Task force

f) participated in negotiation of operating arrangements and commercial agreements with Scotland and with France

Subsequent to that initial work, I have continued to advise NGC on organizational, commercial, and operational issues. This experience with open access markets has been extended through market design and implementation activities in Canada, Sweden, Australia, New Zealand, and Northern Ireland. In the US, I was engaged in early development of market design and operational issues for the Pennsylvania-New Jersey-Maryland (PJM) Power Pool. I have advised a major participant in another power pool on competition issues. I have assisted the ad hoc industry working group which is developing requirements for Interconnected Operations Services (IOS) and have advised the Edison Electric Institute on pool comparability, ancillary services, and the proposed Capacity Reservation Tariff.

Q. Have you testified previously?

A. Yes. I have testified before the Federal Energy Regulatory Commission.

II. PURPOSE

Q. What is the purpose of your testimony?

A. I have been asked by the Arizona Public Service Company (APS) to review the ACC's proposed rule and comment on the proposed time table and discuss what steps should be taken in order to preserve reliability. In order to do this, I will first briefly describe what is meant by reliable electricity supply and how reliability is maintained in the existing environment. Then I will identify some of the reliability problems to illustrate the challenges which must be met before actual operation of a new market structure can begin. *This testimony only provides a very brief introduction to the reliability issues which must be addressed.* The intent of my discussion is not to indicate that retail competition should not be undertaken. Rather, my purpose is to try to focus attention on the process and organization, as described in the Executive Summary, which is required to design a market and operational frame work which mutually reinforce reliable operation of the entire electricity system.

III. SUMMARY OF CONCLUSIONS

Q. What is your opinion of the Arizona Corporation Commission's (ACC) proposed rule with regard to the implementation time table?

A. The proposed implementation time table is extremely ambitious and likely to prove unrealistic, both in terms of development of the market design and operational requirements and the many related implementation details. The time table is *theoretically* possible. However, I have yet to see established in the U. S. the kind of an organizational structure, with the required authorities, necessary to translate broadly stated concepts into working processes which will be accepted by a diverse mix of stake holders. I have been extensively involved in development of competitive markets in other countries. In those situations, there has generally been strong, authoritative participation by the government. The industry has, in many instances, been entirely owned by the government. Implementation of retail competition in the U. S. and in Arizona presents a much more complex situation. Here, unlike the foreign markets, we have a diverse mix of ownership, pre-existing contractual rights, multiple electrical control areas, multiple transmission owners and operators, and a two tiered economic regulatory regime. I will illustrate the time that may be required. I began work on market restructure with the Pennsylvania New Jersey Maryland Interconnection (PJM), a pool of ten investor owned utilities, in 1992. In spite of intensive efforts over the last four years, this group has not reached agreement on a wholesale market regime which is acceptable to the Federal Energy Regulatory Commission (FERC). This is not unusual or unexpected.

Arizona, with its mix of ownership and multiple control areas, and requirements for not only wholesale, but also retail competition down to the residential level, creates far greater difficulties than confront the members of PJM. Even the foreign industry restructuring efforts, which permitted governmental entities to exercise far greater powers, have not attempted to introduce retail competition at the residential level on day one. In England, that will first happen in 1998, eight years after initial operation of their market.

The proposed rule does not demonstrate a comprehension of the extent of negotiation and practical development which must take place if Arizona is to implement a market which avoids the many pitfalls which could result in inequities for retail customers and increased risks to reliability.

Q. Are the Arizona Corporation Commission's proposed rules adequate to ensure that reliability is maintained?

A. The proposed rules establish a "working group on system reliability and safety." It also notes that there should be compliance with applicable reliability standards and practices. These provisions are good. However, they fall far short of demonstrating a comprehension of the existing state of reliability and how it is maintained and of the extensive work, which has begun, but is not yet complete to develop a technical framework for insuring reliability in a world in which individual customers may shop for electricity. The existing industry standards and guidelines were simply not designed for such a world.

I had the personal experience of working on a day-to-day basis to create such an operational regime in England, *a far simpler environment than the one which exists in Arizona*. There, the operational rules which were necessary to insure reliability were developed over two years of intensive effort. In England, that process began in the summer of 1988 and was concluded in March of 1990. Stakeholders were permitted very little participation, e.g. the British Government unilaterally decided that it would represent the interests of independent generators in the development of the Grid Code. There was only a single control area. There was only a single transmission owner. There were interconnections to only three other systems. No scheduled physical delivery transactions were allowed. The control area operations and the transmission lines were owned by a single entity, the National Grid Company (NGC). When policy issues arose, the government was decisive, e.g. it elected to put full faith in market mechanisms to attract adequate generation investment to preserve reliability - there is no obligation on any party in England to invest in generation.

Only with a well organized, managed, and adequately resourced implementation effort, can Arizona expect to implement an investment and operational frame work which will preserve reliability.

Q. Can a competitive market which is compatible with reliability requirements be introduced in Arizona?

A. Yes, it is possible to develop and implement a competitive market, one that is based on a set of operational obligations and rules and appropriately established incentives which will permit competitive forces to govern the price of electricity and which will preserve reliability. But this will only happen if the ACC and all parties undertake the same substantial developmental effort which has been mounted in other countries. It must be remembered that though there is a significant amount of open access market developmental work currently in progress in the U. S., we do not yet have a working retail competition market. Arizona is just at the beginning of such a process.

Q. What should the ACC do?

A. First, the ACC should reconsider the implementation sequence that it has set forth in its proposed rule. A time table and sequence for implementation should only be established after the ACC, and all other stake holders, have a better understanding of the work which will be required.

A full time staff should be appointed with responsibility for directing and coordinating the activities of task forces.

At a minimum, there should be task forces established for each of the following areas:

a) Stranded Investment task force
b) Market design and settlements task force
c) Planning and design standards task force
d) Operations task force

e) Metering task force

Two of the most essential implementation documents would include:

a) Technical "rules of the road" which dictate the security standards by which the physical electric system will be operated

b) Commercial "rules of the road" which dictate how various services will be paid for and who is obligated to pay for these services

It is common for governmental agencies and other parties to desire to implement new markets without the substantial commitment of resources and establishment of the types of administrative effort that I have outlined. It is my view that such a structure and process is absolutely necessary if one is to move past unending negotiations into actual operation. A second difficult issue is governmental or regulatory *will* to make the difficult decisions which will inevitably arise. There is a tendancy of regulators or public policy makers to provide only general policy direction and not to become engaged in the very difficult details which must be resolved and arbitrated in order to reach a conclusion. The ACC should only start this process of substantial restructure if it is willing to become informed on issues of detailed implementation and invest the necessary time and resources.

IV. RELIABILITY AND COMPETITION

Q What is reliability of electricity supply?

A. "Reliability" is keeping the lights on. If your electricity service is interrupted frequently and for long periods of time, you have unreliable service. This is unacceptable to an economy and society which is dependent upon electric energy.

Q. Why should reliability be an issue for discussion with regard to introducing retail competition?

A. Retail competition will result in new participants in the electricity market. These parties will not be familiar with the investments and operational obligations which are required to maintain reliability. The ACC must fully consider this reality as it develops its concepts and time table for implementation.

More competition among suppliers and buyers of electricity will bring about increased pressures to reduce costs. This is part of the justification for replacing the current system of regulated monopoly supply with one which is more reliant on competition. There will be a much larger number of participants in the market. Both the pressure to reduce costs and an increase in the numbers of participants and electricity transactions will, unavoidably, introduce greater risks to reliability.

There is very little experience with retail competition, essentially none in this country. Internationally, retail competition has been introduced in several of the developed countries, but only to a very small extent at the residential customer level. In a number of countries, such competition was first introduced for only the largest customers with a gradual introduction of smaller customers over a period of years. It is generally accepted that the number of customers, and corresponding transactions, not the size of the customers engaged in competition, has the greatest potential for adversely impacting reliability.

My colleagues and I were extensively involved in establishing an operational framework for preserving reliable operation in England and Wales, the largest introduction of retail competition to this point in time. It has been proven that it is possible to have both competition and reliability - *but not without understanding the additional risks and taking specific steps to mitigate the inherently increased threats to reliability.* Retail competition can be introduced in a way which substantially increases the risks to reliability. However, it is also possible to design market structures which can reinforce reliability and moderate any potential adverse impacts.

Q. Explain the interaction between reliability and economics.

A. Reliability and economics are inextricably linked. Generally, the greater the investment in facilities, the greater the reliability that one might expect. If a single customer is served by two power lines, each of which is served by a separate source of energy, it is protected against the loss of one of those lines or sources, e.g., a car hits a pole and causes an outage of the lines serving a residence. If, in this case, the customer is served by a second line, there will not be an outage. The customer will have more reliable service than if there were only one line. But this reliability is provided at the additional cost to install the second power line.

This analogy may be carried all the way through the process of distribution of electricity, the transmission of electricity, and the production of electricity. It is not unusual to serve large concentrations of load with a *transmission network* which links multiple generators and sources of energy from neighboring systems with multiple delivery points to the distribution system. Because the loss of equipment at higher voltage levels or of generating stations can have much wider potential impact than a car hitting a single distribution pole, the added investment in reserve facilities has been judged to be a prudent "insurance policy." In fact, regulators begin to worry about inadequate investment if they see too little in the way of backup generation or transmission capacity.

So reliability has a cost. That cost may be in terms of a fixed investment in additional facilities such as cables and other equipment or it may be in additional investment in fuel to provide an injection of energy at a critical part of the network. An example is operation of relatively expensive generation which is located close to load centers in order to provide insurance against loss of less expensive, but remote generation sources.

Every time that a regulatory commission has approved a cost base for retail tariffs, it has implicitly accepted a standard of reliability. The entity could typically have reduced its costs by reducing its reliability standards.

V. RELIABILITY GUIDELINES AND STANDARDS

Q. How is reliability achieved in today's form of electricity supply?

A. Reliability begins with how the entire system of generators of electric energy and wires and equipment for delivery of that energy are designed, built, and operated. Today, the guidelines and standards for these activities are developed and administered by the electricity industry on a cooperative and voluntary basis. The industry is regulated at either the state or the federal level in a number of aspects such as prices, environment, antitrust and other matters. It is not, however, regulated on technical issues. In the sense of reliability, the industry may be said to be "self regulating," a process that has worked very well. The reliability of America's electric systems measures well against those of other developed countries.

This high degree of reliability does not just happen. It is a result of development of a system of guidelines and standards. These guidelines and standards are primarily of a local nature for the system which provides energy delivery to retail customers, the *distribution system.* The distribution system is exposed to man-made interruptions such as the motorist who hits an electric pole. It is also exposed to natural events such as wind storms and lightning.

In order to protect against such events, each utility which serves retail customers develops its own planning criteria, design and construction standards, and operating practices. While these may differ from one utility supplier to another, they typically fall within an accepted band of performance. Whenever a utility notices a trend toward increasing outages, it will generally take such steps as may be necessary to remedy the problem.

National and regional guidelines are relevant at higher voltage levels, generally referred to as the transmission network. Since it is not economically or environmentally feasible to generate electric energy in one's own backyard, large generating plants are constructed at some distance from the loads which they serve. It is most economic to construct power lines which are operated at much higher voltages in order to deliver the energy over distances. However, while these facilities are less exposed to man-made risks such as the errant driver or to natural risks such as a storm, they are subject to equipment failures or mistakes by operating staff. At this level, a failure of a single generating unit or of a transmission line can have severe consequences. Having recognized such possibilities, planners build in a degree of reserve facilities so as to insure against any single outage. An accepted design guideline requires that the transmission network should be capable of withstanding the sudden loss of any single part of the network. That could be a breakdown of a pump in a power plant or an improper operation of a device for protecting transmission lines. In either case, a large source of electric energy could be lost and a complex set of disturbances could be set in motion. Unfortunately, two such events have happened in the west in 1996, in spite of the current system of guidelines and standards.

As the ACC has noted in its proposed rule, the electricity industry has developed guidelines for operation of electric systems which are connected to one another. There are national guidelines developed by the North American Electric Reliability Council (NERC). There are regional guidelines. The ones which affect Arizona utilities have been developed by the Western Systems Coordination Council (WSCC).

These guidelines may be characterized as "interfaces," protocols or codes. They describe the respective obligations of entities which are connected to one another or of entities which engage in trading over interconnected transmission networks. These interface documents are in contrast to the internal operating procedures which each control area operator must develop to guide the actions of his own staff.

However, these guidelines are only just the beginning. More detailed guidelines and standards have been developed by local utilities. The guidelines are implemented through the design and installation of equipment so as to provide the required degree of protection. Utilities have not only invested in generation and transmission facilities which are adequate to meet demands, they have made additional investments so that customers are assured that a level of reserves, like an insurance policy, are provided to protect against unexpected, but possible emergencies.

Further, the utilities are engaged in ongoing training programs such that the equipment is operated and maintained in a reliable manner. Finally, the system is planned day-by-day and dispatched minute-to-minute to meet possible emergencies.

Even with all of this planning and preparation, outages do occur, both on an isolated local basis and on a widespread basis, such as occurred in the west this past summer.

Q. Are the current system of guidelines and standards adequate to preserve reliability in a world of retail competition?

A. No. The current system of guidelines and standards was designed for a much smaller number of participants in the electricity market. It is also based on an assumption that the entity which dispatches and controls a portion of the electric network will also own and operate both generation and transmission. This may or may not be true in the future. There has not been a need to be so detailed in documenting operational guidelines and standards when the entity that controls the network and dispatches generation, also owns and operates the generation and owns and operates the transmission facilities.

Increasingly, internal administrative control mechanisms within a single corporate entity are being replaced with contractual agreements among nonaffiliated entities. The industry has already begun the task of developing new operational guidelines to reflect developments such as the introduction of wholesale and retail competition. However, these efforts are at an early stage of development.

The existing system of guidelines serves as an excellent starting point for extension and refinement such that they will provide all parties to the new electricity supply industry with clear statements of obligations regarding planning, design, construction, and operation of that system. The documents will have to take into explicit account the role of retail customers and of all other parties which may be engaged in activities which could potentially affect the reliable operation of the network. This is not unlike what has occurred elsewhere.

Q. How have other countries addressed the need for reliability guidelines and standards as they introduced wholesale and retail competition?

A. The largest open access market which has been established up to the present time is the one in England and Wales. In that market, retail competition is being phased in over a period eight years. This is being accomplished by first permitting competition for loads in excess of one megawatt in 1990, then loads 100kw and greater in 1994. In 1998, virtually all loads will be open to competition.

Reliability was a concern from the beginning of the restructure in England. The British Government required that there should be a continuation of the centralized generation and transmission control which had been in previous operation. The Government also stated that the companies which were to provide delivery service, at both transmission and distribution levels, were to draft a code of technical and operational requirements to be applied at both the distribution and the transmission levels. The result was the creation of a set of technical codes, based on existing standards, that were written in the context of a competitive market. All entities were required to obtain licenses for generation, transmission, distribution, and retail or wholesale sales. A condition of these licenses was that each entity must be bound by the applicable transmission code, distribution code, or both codes. The obligation to comply with the codes were given contractual strength, in addition to the regulatory obligation, through provisions in the transmission tariff, e.g. transmission service as stated in the tariff, was conditioned upon acceptance of the code. This is similar to the tariff provisions which are imposed by many U. S. utilities on any customers which connect to their systems, especially customers that connect at higher voltage levels.

Internationally, each successive competitive market has built upon this strategy of creating uniform technical standards for security and reliability. Arizona should consult the transmission and distribution operational codes which were developed in England and other countries as it establishes its own operational tools. While it is true that each situation is unique, there are relevant lessons to be learned and applied. It is not necessary to "reinvent the wheel" with respect to planning and operational guidelines.

Q. What are the major areas of reliability concern which must be considered as retail competition is introduced?

A. The two major areas which must be of concern in development of retail markets for electricity are adequate *investment in generating and transmission capacity* and adequate *operational requirements.*

VI. INVESTMENT FOR RELIABILITY

Q. Why is investment in generation a concern with regard to reliability?

A. A major concern in the design of wholesale and retail competitive markets has been the adequacy of generating capacity. Will these competitive markets provide enough confidence for future investments when new or additional generation is required? What effect will retail competition have on the need to *insure* that there will be adequate generating capacity?

Today, for instance, the local utility is granted a franchise to serve retail customers. One condition of that franchise is that the utility will make such investments in generation as are necessary to provide reliable service.

In other markets which have introduced retail competition, the obligation to install adequate generating capacity, which has previously been placed on the holder of a franchise, has been removed. The theory is that competitive markets for electricity will attract those projects which are needed and valued by potential customers. Such projects are judged to be likely to earn an attractive return on investments in a competitive market. This logic holds that there is no need to obligate an entity to make such investments. Indeed, it is difficult to understand how such an obligation can be imposed unless a regulatory commission can guarantee that the investment will be recovered.

Electricity customers may be at some risk that the market may not respond as expected. In such an event, at least three possible adverse situations could develop:

a) Relatively high operating cost plant, such as combustion turbines which can be installed very quickly at relatively low capital expense, but with a high variable cost could be installed. This could act as an insurance policy against insufficient generating capacity. In this case, adequate reserves could be provided but at a potentially high variable cost.

b) A second possibility would be that a party which failed to invest in its share of reserve capacity would use, without compensation, any excess capacity which another party might have installed. An example would be if a commercial customer failed to provide for back up to its normal source of electric energy, other customers, including residential customers, may bear the cost of providing plant for the security of the commercial customer. Reliability would not be impacted, but the customers of the entity which provides the back up generating capacity would be subsidizing the commercial customer, a situation of inequity.

c) A failure to install adequate capacity would expose the customers to the possibility of insufficient generation to meet load. In such a case, during periods when existing generating units were out for maintenance, or during periods when peak loads were being experienced, the risk of inadequate supply for all Arizona customers might be greater in the event of some unforeseen equipment failure or natural event which caused the loss of generating capacity.

The preferred approach, which would reduce exposure to such risks, would be to impose an obligation for all participants in the market to meet some minimum level of investment in facilities as a condition of being permitted to use the transmission network and lower voltage delivery systems. Such an obligation should be endorsed and supported by the appropriate regulatory body.

One enforcement mechanism would be to establish a penalty charge which would be assessed against any party which failed to provide its amount of generating capacity during a period. The proceeds from such levies would be allocated among the parties which had installed generating capacity above the amount which was their obligation. Numerous details must be worked out in order to implement such a scheme. However, such an approach is not breaking new ground. One may reference the various installed reserve capacity requirements, with associated penalties, which are in operation or proposed in New England and in the mid-Atlantic area.

Q. Another major concern is the adequacy of the transmission network. What effect will retail competition have on the need to insure that there will be an adequate investment in transmission capacity?

A. Transmission will continue to be a regulated business. As a condition of being permitted to operate, the respective transmission providers will be obligated to connect any customers which request service, provided that the customers comply with published technical operational standards. Such obligations must be designed so as not to discriminate either for or against any class of potential users of the network.

Reinforcements and expansion should be undertaken in the interest of preserving reliable operation and facilitating trading over the transmission systems. The entities which are assigned the transmission function and the obligation to make such investments, should be permitted to charge transmission customers tariffs which are sufficient to recover the cost of an investment and a reasonable profit margin on that investment. Arrangements and incentives will have to be established to ensure that cost-effective reinforcements and expansions are identified. Such a planning process should include the opportunity for input from all segments of the electricity market.

World wide, there are at least two open access markets, in England and Alberta, in which the provider of transmission service is also responsible for the additional cost which may be incurred due to constraints on the network. Constraints arise when there are insufficient facilities to enable delivery of all of the transactions which have been scheduled for which are the least expensive energy. It may be uneconomic to remove such constraints through additional investment, e.g., the increased capital would not be offset through a reduction in variable operating cost.

In the two open access markets cited above, the transmission operator may evaluate whether it is in its best interest to continue to incur the expense of higher cost generation which results from the constraint or invest in facilities to eliminate the constraint. These are examples of two explicit incentive schemes of which we are aware which are designed to promote voluntary expansion or reinforcement of the network. Other investment incentive schemes, based on a system of congestion charges, are currently under consideration, but have not yet been fully implemented.

VII. OPERATIONS AND RELIABILITY

Q. What are the operational issues which are of concern with regard to introducing retail competition and maintaining reliability?

A. There are many operational details which must be identified and addressed in order to establish, monitor, and enforce the rules which are required for reliable operations. As we have noted previously, these rules should be stated in a document, or package of documents, which might generally be referred to as planning and operational codes or protocols.

The range of issues which must be considered include, but is not limited to items such as:

a) demand forecasting
b) maintenance planning
c) operating reserves
d) voltage regulation
e) frequency regulation
f) demand control

g) scheduling and dispatch of generation and transactions

h) monitoring and security assessment of real time operations

I) safety coordination for switching power lines

j) system restoration following blackouts

k) record keeping

For many of these issues, the questions which must be addressed include:

a) Who sets the rules?

b) Who administers, monitors, and enforces the rules?

c) What penalties or incentives are established to promote compliance with the rules?

I believe that the industry cannot solely rely on purely voluntary mechanisms as it has in the past. Regulators must accept that they will have to approve and support enforcement of a system of penalties and incentives to promote compliance with centrally administered rules.

All of these issues must be addressed and resolved, in detail, before the new market can be implemented. The subsequent discussion only highlights only a *small sample of the operational problems which must be addressed before retail competition can be introduced.*

Q. The propose rule has made reference to an Independent System Operator. What is an Independent System Operator?

A. Independent System Operator (ISO) is a term which is still evolving. Generally, it is intended to indicate an entity which is responsible for insuring even-handed operation of the transmission network, and possibly, a spot market for electricity. The need for an independent central market administrator is in response to the perception that the currently existing control entities also own and operate generation and, in many cases, serve retail load. There is a perception that other entities which are competing to sell generation services or retail customers which are seeking other suppliers would not be treated fairly by the existing control entities. Therefore, the concept has been developed of a system operator which is independent from generation sales or from electricity purchases. However, there is little agreement as to the extent of functions which such an entity should perform or of the appropriate mechanisms for supervising its work. This latter issue is referred to as "governance." The issue of govenrnance is crucial. How does one insure fair and open administration of the transmission system without intruding on the rights and fiduciary obligations of owners of the transmission facilities?

One function which an ISO may perform includes monitoring system security and redispatching generation to maintain security. A second major function would assign generation scheduling and dispatch authority to the ISO. In such a role, it might act as a central administrator of a regional market for electricity. A third function would be to have the ISO purchase and resale various services which are essential for meeting continuity of service, voltage, and frequency criteria. These services have been defined as "interconnected operations services," (IOS) of which the "ancillary services," as defined by the FERC, are a subset.

There is little agreement within the industry as to having it perform generation scheduling and dispatch service and provision of interconnected operations services.

Q. What is a Security Coordinator?

A. A "Security Coordinator" is an entity which is responsible for monitoring the security of a regional transmission network. As in the case of the Independent System Operator, the Security Coordinator concept is still evolving. Generally, the Security Coordinator will be provided with information which is required for monitoring a defined portion of the transmission network. As recommended by the North American Electric Reliability Council, the Security Coordinator will, at a minimum, operate twenty-four hours per day, identify potential problems, and coordinate emergency control actions. In order to carry out its responsibilities, the Security Coordinator may be delegated authority by control centers within its area of responsibility. It may also be delegated physical control of some facilities.

The Security Coordinator concept is primarily focused on maintaining reliability on a regional basis. The ISO's range of functions is likely to be more extensive than those which are assigned to a Security Coordinator.

Q. Why is a regional ISO or Security Coordinator needed for reliability purposes?

A. Electric system emergencies may originate in one area and spread to another. This has been demonstrated in the west. However, the control responsibility is divided, both within and among geographic areas. Currently, there are over 150 control areas in North America. Each of these is responsible for dispatching generating plants which are within its area of responsibility. They are also responsible for managing energy transfers between the control areas.

In order to assess security, system operators must be able to "see" beyond their immediate borders. They need to know which generating plants will have reserve capability, what transactions are planned, what transmission facilities are available to transport energy, and what loads are expected. This information needs to be continuously updated to reflect changes as the time of actual dispatch approaches. It is currently exchanged between system operators, but the recommendations to establish regional Security Coordinators reflect a consensus that improvements are needed, even without considering the potential effects of retail competition.

The addition of many new participants in the market creates greater potential for failing to observe remote changes in generation, transmission, transactions, or loads which could or which already have adversely impacted the reliability of the system. An entity which is empowered to obtain direct information from a number of subordinate control areas may be in a better position to identify potential problems and recommend, or better yet, *issue instructions* to avoid a potential risk to regional reliability or to correct a problem which has occurred. If such entities are created, very careful attention must be given to establishing clear operating authorities among control centers.

Q. How will an increase in the number of parties which buy and sell electricity impact reliability?

A. Operation of the power system requires a mix of automatic control actions and of manual actions. The system will not perform reliably without manual intervention. It is important to understand this aspect of power system operations in order to appreciate the potential difficulty which could arise if system operators must manage many more energy transactions than they now do. The number of transactions which they will be called upon to manage will be directly related to the type of market design which is adopted for Arizona or the region and the number of market participants.

For instance, one possible market design would permit many electricity customers to independently negotiate purchases from remotely located suppliers, e.g., New Mexico, Colorado, and Utah. It would be possible for a single customer to have one supplier for day-time hours, another for night-time hours, and a third for weekends. The possibilities are very large. If these are *physical delivery transactions*, the buyer would have to tell his control area operator the size of the transaction (megawatts), the start and stop times, and the transmission path to deliver the transaction to the control area.

In order to provide for physical delivery for each of these transactions, a control value must be calculated by the control area operator. In industry jargon, this is the "net interchange schedule." This control value is manually entered into a control system which automatically changes generator dispatch settings so that the proper amount of energy is exchanged with neighboring systems. Any time that a customer wishes to change a transaction, this control value must be recomputed. Any time that a generating unit or a transmission line, which is involved in delivery of the energy, suffers an outage, the operator may need to adjust the control value. Any time flows between neighboring systems are higher than studies indicate to be safe, there must be a curtailment or readjustment of transactions.

All of these situations can require extensive communications between the system operator, the customers within his control area, and with neighboring systems. It can be easily seen that, with hundreds or thousands of customers engaged in such trading, there is a very large potential for operational errors which might occur due to misunderstanding the amount, start, or stop times for transactions, failure to observe system conditions, and communication breakdowns between neighboring systems, e.g., a failure of operators of neighboring systems to completely understand one another. These are not academic possibilities. System operators can cite outages which have resulted from such operational errors.

So the sheer volume of transactions and the entry of new participants into the market can place reliability at greater risk than currently exists.

Q. Is there an alternative market design which would permit retail competition without depending upon large volumes of physical delivery transactions?

A. There is an alternative. The transactions which will present the greatest challenge are those that were just described, ones that are related to physical delivery of electric energy, transactions each of which must be reflected in a physical control action. An alternative method, which would greatly reduce the risk to reliability would be to create a type of market in which trades do not result in a control action for each and every transaction. Such markets have been created in England and Wales, in Victoria, Australia, and in Alberta, Canada. The trading in these markets is in the form of financial transactions similar to commodities trading.

I will not try to explain this process here. I only wish to emphasize that while physical delivery transactions do pose an increased risk to reliability, there are alternative market designs that can avoid this danger. A pragmatic market design will permit both physical delivery transactions along with financial transactions. However, the market design must support enforcement of rules which permit system operators to manage the physical delivery transactions without jeopardizing system reliability. Such rules might include a requirement to notify a control center of a transaction at least six hours before the transaction is to begin. As the number of physical transactions increases, either the operational tools and staffing may have to be increased or the notification time may be increased. A step-by-step approach should be taken to determine the appropriate volume of physical transactions which can be managed within a specified notification period without unduly increasing reliability risks. Recall that England, without the complexity of physical delivery transactions, is taking eight years to introduce retail competition at the residential level.

VIII. OPERATING CULTURE

Q. What has been the effect of retail competition on the people responsible for scheduling and dispatching the system?

A. There has been a large challenge to retrain system operators to assume new roles in competitive markets. This change can be implemented, but not without extensive training in the application of new guidelines and standards and operational procedures.

Q. How will competition affect the communication and cooperation of transmission and generation providers which has been critical for system reliability to date?

A. Increased competition at wholesale levels over the last ten years has placed additional stress on the previous open communications among generation and transmission providers. This open sharing of information has helped system operators to plan and dispatch the system in a reliable manner. Today, system operators are still able to work openly with generators when there are problems. They have been aware of those times when they might need to make arrangements for backup to protect against possible emergencies.

With a substantial expansion of electricity competition, there is a greater reluctance to provide information which may be of commercial value to a competitor. While some production cost data is not required in order to operate a secure transmission network, certain operational characteristics are. System operators must know the speed at which generating units can be loaded. They must know when generating units will be removed for maintenance. They must know where possible reserve generation is available. Therefore, in order to preserve reliable operation, rules must be established which obligate all parties which are connected to the network to provide specified information to system operators.

Codes of conduct must be established which prevent any system operator from using such operational information to the commercial benefit of any affiliated generating business or load serving business. Monitoring and enforcement mechanisms will be required to ensure that all parties comply with such rules.

Q. How will reliability criteria, such as required operating reserves and frequency regulation be enforced?

A. At this point in time, U. S. utilities comply with reliability criteria on an entirely voluntary basis. It is possible for them not to provide adequate operating reserves or capability to regulate frequency without incurring any penalty other than a rebuke from the industry. This regime has been adequate. The quality of supply as measured by continuity of service, voltage, and frequency is very high. However, all of this has been in the context of provision of monopoly service. The costs to provide such services as operating reserves and regulation capability have been accepted as an integral part of electricity service and have not been unbundled. The retail customer actually receives many services under a single tariff.

In the new world of competition, such services as operating reserves and regulating capacity may be treated as discrete services which are differentiated from basic electric energy service. If the system operator does not have access to operating reserves which may be called upon in emergencies, he may be forced to shed load. If the same operator does not have access to generation which can change output levels with sufficient speed, the frequency may vary beyond accepted norms.

In order to avoid such situations, it is necessary to establish specific standards which require provision of operating reserves and regulating capacity. Methods of compensation must also be provided. An example might be to accept bids for reserving generating capacity for use in an emergency. A reservation fee would be paid and an agreed method would be established for pricing any energy in instances in which the reserves are actually dispatched. Payments could be made contingent upon satisfying stated performance criteria. An alternative approach would be to compel any generator which is connected to the network to make operating reserves available to the system operator on a daily basis. If the generator failed to do so, he might then be instructed to stay off the system or the system operator might refuse to accept any price bids from the generator.

These are among the many issues which must be addressed in the design and implementation of open access markets. There is no single solution for providing a system operator with all of the necessary tools which are required to maintain reliability. However, it can be said that specific provisions must be made in order to ensure that this important facet of electricity supply does not become a casualty in the emerging competitive energy market.

Q. As the possibility for nonaffiliated participants in electricity supply increases, how will system operators prevent or correct such problems as overloaded power lines?

A. Potential system overloads can only be identified if the system operator is provided with adequate information by all parties which intend to inject energy into the system, whether through generation or imports from sources which are external to the system. The operator must know the availability of generation plant and of transmission facilities. He must develop load forecasts. With all of this information, it should be possible, for all of the assumptions, to identify the potential for overloads. If such problems are identified, the system operator will order remedial actions on the part of the various participants in the market. These participants must agree to respond to scheduling and dispatch instructions in accordance with predetermined operational requirements. There may be compensatory financial arrangements or there may not be such arrangements. However, no transaction will be allowed to jeopardize the security of the system if it is determined to cause a potential overload.

If, in actual operation, an overload is encountered, the system operator will be authorized to order changes in interchange schedules or generation schedules, and dispatch as necessary to relieve the overloads. Commercial consequences of such activities will be predetermined.

IX. SAFETY NET AND INCENTIVES

Q. In a retail competition market, will there be a "safety net," a designated provider of last resort for essential services?

A. The Federal Energy Regulatory Commission (FERC) has imposed an obligation on all providers of transmission service to also provide essential support services known as "ancillary services." These include operating reserves and scheduling services. This requirement creates a "safety net" to ensure that any retail customers, or their agents, which purchase transmission service in order to deliver energy purchases, would also have a source for those additional services which are required to insure reliability and quality of service.

The designated provider of last resort and how its obligations can be met will be a key issue to be decided as the design of the electricity market unfolds. Clear assignment of this responsibility and development of the implementation details is essential to maintaining reliability for all electricity customers. However, it is not enough to only assign responsibility. Compensation provisions must also be included which provide adequate incentives to provide essential services. Inadequate compensation may result in business decisions to shut down marginal units which may have substantial reliability value.

X. SUMMARY

Q. Summarize your testimony.

A. The proposed rule raises a concern that the ACC is not fully aware of all that must be accomplished in a very short period of time in order to implement a reliable open access market by 1999.

Competitive markets, including retail sales, are possible without unduly increasing risks to reliability. However, this is only true if the currently existing planning and operating obligations and rules are redesigned for such a world. Internationally, all other competitive markets operate on a foundation of technical obligations and operational rules which permit open access to trading in electricity, *provided that the participants comply with those obligations and rules.* Public policy makers and regulators will be called upon to approve and enforce contractual incentives which will be required to promote compliance with the operational rules.

International experience has taught that many conceptual approaches to new markets, which initially might have been thought to be unworkable, have been made to work. But these foreign electricity supply industries have been considerably less complex than one finds in the United States with its diverse mix of ownership of assets, pre-existing contractual rights, and two tiered economic regulation. While there is a significant body of experience with competition at the commercial and the industrial customer level, retail competition at the residential level is at an embryonic stage of development. Considerable work remains in order to extend the existing operating regime and to include market instruments to support a new form of electricity supply, one that will continue to provide the level of quality and reliability of service which each and every customer has a right to expect.

APPENDIX 1

James V. Barker, Jr.

Key Qualifications:

Management Consulting Services

Mr. Barker directs KEMA-ECC's Management Consulting Services business area. He has over 30 years of experience in working with electric utilities. His experience relates to organization and staffing, industry restructure, including regulatory issues, and commercial and operational matters which include bulk power trading, transmission service, power pooling contracts, and grid code development. Mr. Barker applies his knowledge of power system design and operations and his governmental experience to the development of commercial arrangements which meet the requirements of a competitive electricity market. He has extensive first hand experience in the practical aspects of implementation of new market structures.

Industry Restructuring

Provided or providing advice in restructuring of electricity supply in England & Wales, Canada, Victoria (Australia), New Zealand, Sweden, European Union, India and to major US utilities and power pools. This advice has covered the entire spectrum of the commercial, legal, and operational details. It has included creation of and participation in the organizations required to implement new market structures.

Transmission Access and Pricing

Has advised on transmission tariffs for emerging markets including retail competition and for traditional wholesale competition. Advice has included pricing and operational issues and facilitating coordination with regulators.

Power Supply Contracts

Provides power contracting advice for retail and wholesale competitive markets. Advice has included drafting pool operating and facilities contracts, pricing services, review and recommendations on market strategy, and testimony before FERC.

Interconnected Operations

Extensive experience in all aspects of interconnected operation including design, commercial, and operational aspects. Has participated in establishment of international and US interconnection contracts and arrangements. Advised on development of UK Grid Code and on scope and application of technical access requirements in the US. Prior to joining ECC, directed the US government program to encourage pooling and coordinated operations. Also managed the Department of Energy office responsible for permitting international interconnections.

James V. Barker, Jr.

Profession: Executive Consultant

Years of Experience: 30

Education:

B.S., Electrical Engineering, Virginia Polytechnic and State University, 1962

Experience Record:

1981 to Present: **ECC, Inc.**, Fairfax, VA

Executive Consultant & Vice President, ECC's Management Consulting Services. Vice President & Executive Consultant, ECC's Management Consulting Services. Mr. Barker recently reviewed the planning and operating criteria of a major US utility with regard to its competitive position in the region and taking into account the potential requirements of industry deintegration. He has also reviewed proposed methods for charging for generation reliability and has recommended alternative methods to meet comparability tests. He is assisting Edison Electric Institute (EEI) on Mega NOPR issues relating to pooling, comparability, and ancillary services. He is currently advising the World Bank on reform of the State owned electric utilities in India and is facilitating implementation of restructure in the States of Orissa, Uttar Pradesh and Haryana. He has recently advised the National Grid Company (NGC) in England with respect to staffing levels, work processes, tools and procedures as necessary to minimize transmission constraint costs. He also has assisted NGC in identifying technical and commercial issues needing to be resolved in order to implement possible reforms to the England/Wales electricity market. From 1988 to 1990, Mr. Barker managed ECC's team of on-site advisors on privatization and restructure for NGC in England. He advised NGC's Board Member with responsibility for commercial matters on operational, commercial, and managerial issues relating to development of pooling agreements, transmission service contracts, ancillary services, and interconnection agreements. He assisted in early development of the Grid Code (the technical conditions governing planning, connection to, and operation of the transmission network, and scheduling and dispatching generation) and developed the organizational structure and process for the Task Force which completed drafting of the initial issue of the Grid Code. He participated as a member of NGC's Grid Code Coordinating Committee. He participated in negotiation of the British Grid Systems Agreement and other interconnection agreements with Scotland and France. Mr. Barker directed ECC's multi-disciplinary team which recommended, to the Government of India, reform of bulk power and transmission tariffs and regulation of Central Sector generation and transmission corporations. Mr. Barker conducted a workshop on third-party access (retail wheeling) for the Electricity Supply Board National Grid in the Republic of Ireland. In the U.S., Mr. Barker served as an alternate member of the El Paso Electric/Public Service of New Mexico arbitration panel in their dispute over a major new EHV transmission line. Mr. Barker advised the Pennsylvania-New Jersey-Maryland (PJM) power pool during the early stages of development of a new market structure and transmission arrangements. He has assisted a major U.S. utility in reviewing and assessing its participation in a major power pool. He assisted Wisconsin Power & Light Company in facilitating FERC acceptance of its transmission tariff. He has presented testimony on behalf of the Los Angeles Department of Water and Power before the Federal Energy Regulatory Commission. He also participates on the ECC team which is advising Trans Power Ltd. in New Zealand and he has completed a market structure study for Vattenfall in Sweden. He has advised the State Electricity Commission of Victoria (Australia) and Northern Ireland Electricity on issues related to industry restructure and retail competition. He participated on a multi-disciplinary team which advised the Energy Directorate of the European Commission on third party access to transmission. He also advised the Los Angeles Department of Water and Power with respect to organizational issues relating to its telecommunications functions. Other projects include a study of the U.S. power pool operating accounting practices and procedures for the restructure and privatization of the Central Electricity Generating Board in England and Wales; assisting Kansas City Power and Light Company in developing a new organization for system operations; proposing revised pricing of operating capacity services for the Los Angeles Department of Water and Power; a qualitative assessment of operations of members of the Mid-Continent Area Power Pool (MAPP); development of pooling concepts and a pooling agreement for the Northern California Power Agency; screening interchange options, development of functional requirements for an interchange operation, and support for negotiation of an interchange scheduling service agreement for Oglethorpe Power Corporation; and assisting the Southern California Utility Power Pool in implementation of coordinated operations.

1977 to 1981: **U. S. Department of Energy.**
Chief, System Coordination and Power Plant Productivity Branch. Managed Presidential Permit regulatory process for international interconnections and Emergency Electric Power Administration. Created and directed DOE's program to encourage, on a voluntary basis, increased coordination of electric utility system operations.

Directed development of DOE policy on interchange rates and power pooling issues. Managed DOE's program to encourage, on a voluntary basis, electric utility efforts to increase availability of base load generating units. Directed staff of generation engineers in cooperative work with individual utilities, EEI's Prime Movers Committee and Task Forces, EPRI, NERC, and public utility commissions. Participated with several state regulatory commissions in development of incentive based regulation to promote increased generating plant availability. Represented DOE on NERC Generating Availability Data System (GADS) Joint Advisory Committee and on EPRI Subcommittee on Reliability Data Systems.

1975 to 1977: **Federal Energy Administration (FEA).**
Electrical Engineer. Specialist in generation performance data. Participated in analyses of economic, environmental, and sociological impacts of proposed California Nuclear Initiative. Participated in economic analysis of coal and nuclear generation for the State of New York.

1964 to 1975: **Potomac Electric Power Company.**
Senior Project Engineer, Substation Design. Managed section responsible for engineering transmission substations and supporting power dispatching operations. Participated directly in and managed scope of work encompassing communications and control system design, insulation coordination, and physical electrical design. Prepared specifications, evaluated proposals, and performed factory acceptance tests and inspections on power transformers, switchgear, and SCADA systems, including PEPCO's first 500 kV transformers and its first computer-based SCADA system. Led design of PEPCO's first 500 kV substation providing 1200 MVA inter-tie with PJM's EHV system. Represented PEPCO on PJM committees: Substation Thermal Equipment Ratings Task Force, Computer Interface Task Force, and Transmission and Substation Design Subcommittee. Secretary

to Committee responsible for design of transmission and substation facilities associated with Keystone and Conemaugh joint ownership generating stations.

1962 to 1964: **U. S. Army Signal Corps**
First Lieutenant, Communications Center Officer

Languages:	**Speaking**	**Reading**	**Writing**
English	Excellent	Excellent	Excellent

Professional Affiliations:

Chairman, Standards Working Group, IEEE System Operations Subcommittee
Registered Engineer, District of Columbia

Technical Papers/Presentations:

1. *Pool Governance*; presentation made at EXNET Seminar, Arlington, Virginia, January 1996

2. *Power Pools and Evolving Markets in India*; the keynote address presented at CIGRE Regional Meeting on Power Pool Arrangements and Economic Load Dispatch, Delhi, India, October 1995.

3. *Real World Pooling, Grid Code and Implementation Issues*; presented to World Bank, September 1994.

4. *Changing International Electric Utility Bulk Power Markets and Structures*; presented to the Pennsylvania Electric Association, January 1994.

5. *Integrating Market Structures into Electric System Planning*; presented at World Bank Annual Energy Sector Workshop, November 1993.

6. *Bulk Power Market Structures and Pooling Arrangements in the United States*; presented at Second Electricity Law Seminar: "It's a Small World," in Hanbury Manor, Hertfordshire, England, November 1993.

7. *Practical Considerations in Restructuring of Electricity Supply Industries*; a chapter published in the book From Regulation to Competition: New Frontiers in Electricity Markets, May 1993.

8. *Electricity Privatization: Structural, Competitive, and Regulatory Options*; Energy Policy, December 1992.

9. *Transmission Pricing: The U.K. Experience*; presentation to Conference on The New Electric Regulatory Order, Session on Pricing Transmission in Competitive Bulk Power Markets; The Management Exchange, Washington, D.C., November 5, 1992.

10. *International Electric Industry Restructure*; presentation to Edison Electric Institute Power Supply Policy Task Force, Chicago, Illinois, October 1992.

11. *The England and Wales Electric Supply Industry Restructure: A Critique*; presentation at Regional Energy Law Seminar, Hanbury Manor, Hertfordshire, England, November 1991.

12. *Restructure of the British Electric Supply Industry: Operations and Commercial Arrangements*; Presentation to Edison Electric Institute Interconnection Arrangements Committee, Phoenix, Arizona, April 1991.

13. *A Workable Test of a Workably Competitive Bulk Power Market*, Public Utilities Fortnightly, April 1988.

14. *Assessing Electric Interchange Operations,* Public Utilities Fortnightly, May 1986.

15. *Implementation of Coordinated Planning and Operations*, World Bank Power Week, Tysons Corner, Virginia, June 4, 1985.

16. *Interchange Regulations and Incentives*, Iowa State Regulatory Conference, Ames, Iowa, May 1984.

17. *Interchange Regulation and Operating Requirements*, Pennsylvania Electric Association, Suffern, New York, May 1984.

18. *Regulatory Treatment of Interchange and Wheeling Rates*, ECC, Inc., Interchange Arrangements, Transmission, and Power Pooling Seminars, New Orleans, November 1983, through 1992.

19. *Electric Energy Brokering: An Explanation and Status Report*, Public Utilities Fortnightly, February 1982.

20. *Current Status of Pooling in the USA*, Center for Professional Advancement course, System Planning, Power Pooling, and Coordination, October 1981.

21. *Introduction to DOE/NERC Energy Broker Conferences and Seminars*, New Orleans, April 1981, Salt Lake City, April 1980, Kansas City, March 1980.

22. *DOE System Coordination Program*, Public Meeting on Interconnection, Wheeling and Pooling, Oklahoma City, November 1978.

LANDON

BEFORE THE

ARIZONA CORPORATION COMMISSION

DOCKET NO. R-0000-94-165

TESTIMONY

OF

DR. JOHN H. LANDON

ON BEHALF OF

ARIZONA PUBLIC SERVICE COMPANY

NOVEMBER 27, 1996

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I. QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is John H. Landon, and my business address is 444 Market Street, San Francisco, California, 94111.

Q. WHAT IS YOUR CURRENT POSITION?

A. I am a Senior Vice President of National Economic Research Associates, Inc. (NERA), an economic consulting firm.

Q. PLEASE OUTLINE YOUR EDUCATIONAL BACKGROUND.

A. I received a B.A. degree with highest honors from Michigan State University with a major in economics in 1964. I subsequently attended graduate school at Cornell University, where I was awarded an M.A. in economics in 1967 and a Ph.D. in the same field in 1969.

Q. WHERE WERE YOU EMPLOYED AFTER LEAVING CORNELL UNIVERSITY?

A. I served on the faculty of Case Western Reserve University from 1968 to 1973, rising from the rank of assistant professor to associate professor, and on the faculty of the University of Delaware from 1973 to June 1977 as an associate professor.

Q. WHAT SUBJECTS DID YOU TEACH DURING THIS PERIOD?

A. I taught microeconomics, industrial organization, antitrust economics, regulatory economics and economic forecasting.

Q. COULD YOU BRIEFLY DESCRIBE NERA AND ITS ACTIVITIES?

A. NERA is an international economic consulting firm, specializing in issues related to regulation, business strategy and public policy. NERA has extensive expertise in the electricity, gas, telecommunications and water sectors and maintains a practice area devoted exclusively to energy issues. NERA energy consultants have worked on a wide range of assignments for utilities, international agencies, government departments, nationalized industries, regulatory authorities and private sector clients. Our major areas of specialization in the electric power sector include: industry restructuring and privatization studies; utility regulation and restructuring; marginal cost analysis and tariff design; profitability analysis and market segmentation; business and strategy development ; customer preferences and behavior studies, including analysis of customer demand for services, demand elasticity and customer choice analysis; and competitive pricing and positioning studies.

Q. HAS NERA WORKED ON ISSUES RELATED TO CHANGES IN THE ELECTRIC INDUSTRY AND THE TRANSITION FROM A FULLY REGULATED INDUSTRY TO A MORE COMPETITIVE INDUSTRY?

A. Yes. NERA has been involved in some of the most prominent efforts to restructure energy markets. NERA economists were instrumental in setting up the U.K. power pool and spot market for retail open access — the first plan of its type. In the U.S., NERA has been an active participant in the California electric restructuring docket since its inception. We have or are currently addressing restructuring questions in at least fifteen states and two Canadian provinces. NERA has also supported a number of clients in areas related to electric industry reform including performance-based ratemaking, power market analysis and tariff reform. NERA has also been an active participant in the deregulation of the U.S. gas and telecommunications markets.

Q. HAS NERA DEVELOPED EXPERIENCE IN ELECTRIC INDUSTRY RESTRUCTURING ISSUES OUTSIDE OF THE U.S.?

A. Yes. In addition to its experience in the U.K. electric industry, we were active in the reorganization of the U.K. gas industry. NERA has also advised clients concerning electric industry restructuring in Norway, Sweden, Chile, Spain, India, Colombia and Northern Ireland. NERA has completed numerous assignments pertaining to power sector regulatory reform in Australia, Bolivia, China, the Czech and Slovak Republics, Greece, India, Iran, Jordan, Latvia, Morocco, New Zealand, the Philippines, the Russian Federation, Singapore, Venezuela, and Vietnam.

Q. WHAT HAS BEEN THE NATURE OF YOUR ASSIGNMENTS SINCE JOINING NERA?

A. Since joining NERA, much of my work has been on issues relating to the application of economic principles to the electric utility industry. I have participated in numerous projects addressing economic and related antitrust issues before the Federal Energy Regulatory Commission (FERC), the Nuclear Regulatory Commission (NRC), the Securities and Exchange Commission (SEC), state regulatory commissions, and federal and state district courts.

Q. HAVE YOU PREVIOUSLY TESTIFIED?

A. Yes. I have testified on many occasions before state and federal courts and regulatory agencies on a variety of matters.

Q. HAVE YOU PARTICIPATED IN RETAIL ACCESS OR ELECTRIC RESTRUCTURING IN JURISDICTIONS OTHER THAN ARIZONA?

A. Yes. I have been involved extensively with retail access or restructuring issues in New York, Texas, Michigan, Ohio, Iowa, Florida, Louisiana, Oregon and in the Province of Alberta. Outside North America, I have participated in teams working on this issue in the U.K., Chile and Colombia. I have testified in Michigan, Pennsylvania, Iowa and Florida on these issues.

A copy of my resume is Appendix 1 to this testimony.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been asked by Arizona Public Service Company (APS) to provide an assessment of the Arizona Corporation Commission's (Commission) Proposed Rules (Proposed Rules) that establish a schedule and procedure for implementing electric industry restructuring in the state of Arizona.

Q. DR. LANDON, WHAT ARE THE MAJOR AREAS OF THE RULE THAT YOU WILL BE ADDRESSING IN YOUR TESTIMONY?

I am commenting on a number of issues raised by the Proposed Rules, specifically:

- The ACC's Staff Economic Impact Statement
- The role of cost-benefit analysis in determining the economic impact of the Proposed Rules
- The expected near- and long-term efficiencies and costs under a retail access program
- The distribution of the costs and benefits of retail access
- The degree to which the Proposed Rules address the important logistical and technical components of retail access
- The role of the regulator in the Proposed Rules
- The reasonableness of the Proposed Rules' scope and timing
- The treatment of stranded costs in the Proposed Rules
- The solar program under the Proposed Rules

III. Executive Summary

Q. CAN YOU SUMMARIZE THE OVERALL CONCLUSIONS OF YOUR TESTIMONY?

A. Yes. The Proposed Rules fail to provide an adequate framework for the competitive market they propose. Fundamental elements such as how the market will function and how reliability will be insured are given scant attention. Without at least a general framework of how the market would function, it is not possible to evaluate its costs and benefits. The lack of framework is also inconsistent with its ambitious timetable for direct access. Furthermore, the Proposed Rules do not provide a mechanism for producing a coherent market and regulatory framework. They delegate to ill-defined workshops nearly all the substantive issues that need to be addressed before a viable retail access plan can be developed. Workshops are not well-suited to efficiently developing a coherent framework or resolving highly contentious issues in an appropriate and consistent manner. The Proposed Rules also appear to incorrectly assume that retail access will produce many winners and no losers without any supporting analysis. In addition, the proposed solar portfolio is not economically justified and is fundamentally at odds with the Proposed Rules' otherwise stated objectives to introduce competition, reduce costs, and provide customer choice in Arizona.

Q. WHAT ARE YOUR SPECIFIC CONCLUSIONS AND RECOMMENDATIONS REGARDING THE PROPOSED RULES?

A. First, the costs and benefits of retail access in Arizona have not been adequately addressed in the Proposed Rules. Restructuring the state's electricity markets should be pursued in a way and on a schedule that can be shown to produce net benefits from greater economic efficiency. The Staff's Economic Impact Statement (EIS) is supposed to address the economic impact of the Proposed Rules, yet it is an incomplete and surface-level effort. Much more serious attention needs to be given to quantifying both the costs and the benefits of the Proposed Rules before they are adopted. No final competition rules should be adopted until a careful analysis of the costs and benefits of available options has been completed and subject to review and comment.

Second, the distribution of costs and benefits of retail access has not been considered. There are equity issues at stake in moving away from a system in which regulated electric utilities provide bundled service to all customers. Initiating a competitive retail market will disadvantage some consumers while leaving others better off. These relative changes in consumer welfare across customer classes may not produce politically acceptable outcomes. Careful weighing of equity issues should proceed any decision as to how best to move forward toward direct access.

Third, implementing retail access in Arizona will entail significant changes relative to the status quo. Yet, the Proposed Rules fail to adequately address the complex technical and logistical issues that must be resolved in order for the Commission to meet the proposed January 1, 1999 kickoff date. The Proposed Rules establish a definitive timeline for implementing change without providing adequate guidance as to how this will be accomplished. Specifically, the Commission has not addressed several critical areas:

- Without a fully functioning system to coordinate the operation and dispatch of the required power sources, there is no guarantee that transmission systems and generation plants will be optimally used and there may be concerns with market power or self-dealing. Consequently average system-wide costs may not be as low as they can be.

- Without a fully functioning system to coordinate the operation and dispatch of the required power sources, there may be no effective way to maintain system reliability and to reward generators for providing capacity when needed. Power quality and system reliability may suffer.

- Without a fully functioning system to coordinate the operation and dispatch of the required power sources, there will be no effective way to balance supply and demand and set a market clearing price in real time. In a competitive market, price has to be allowed to vary to clear the market. No regulatory substitute will work.

- Without a fully functioning system to communicate the variable system price to large numbers of customers and to receive their responses to varying prices, there may be no effective way to balance supply and demand during emergencies or periods of capacity shortages. The entire system could become unstable.

- Without a fully functioning communication network and significant number of real-time meters, there is no way to encourage customers to respond to high or low prices in real-time. System economics and stability will suffer.

- Without a significant number of customers fitted with real-time meters, or placed on reasonably accurate load profiles, there will be no way to accurately bill customers for what they have consumed given variable prices. Massive disputes and confusion are likely to ensue.

- Without a fully upgraded and functioning customer information system (CIS) there will be no way to produce accurate and timely bills for hundreds of thousands of customers. Billing errors or delays will be highly interruptive and expensive to resolve.

- Without a fully developed and tested settlement protocols, major disputes are likely to arise in determining who has bought what from whom and at what price. Significant sums of money may be disputed and major delays in settling disputes may follow.

- Without clearly defined rules and protocols, provision of and settlements for ancillary services may become problematic or may not be available. Customer frustrations and complaints are to be expected.

These issues need to be addressed in assessing likely costs and benefits, and deciding when and how to proceed.

Fourth, the Proposed Rules delegate to workshops nearly every critical issue that is important to the actual development of a competitive retail market. Although I have no fundamental objections to deferring some of the detailed and technical items to be debated and discussed in workshops attended by industry stakeholders, I do, however, have major objections to assuming that some of the most critical and substantive issues will be satisfactorily resolved in a timely manner through workshops. The Commission is being overly optimistic about the ability of stakeholders with divergent interests to come to mutually agreeable and consistent terms on critical operational and technical issues.

Fifth, the Proposed Rules do not focus on the inconsistency of promoting competition while simultaneously retaining substantial regulatory control. For example, the Proposed Rules mandate that while utilities must provide market access to competitors, the utilities must continue to provide standard, bundled service to their customers who want this service at rates which are presumed to remain at current levels. This is likely to cause market inefficiencies and result in an uneven playing field. The role of the regulator is also unclear with respect to the issue of how system reliability will be achieved. A clear vision of how the proposed restructured industry will be organized and regulated should come as part of assessing costs and benefits and setting timetables — not as an afterthought.

Sixth, the proposed timing is inconsistent with the sketchy nature of the Proposed Rules. Because the Proposed Rules propose to begin retail access in 1999 on a relatively large scale, the consequences of failing to address important technical considerations are quite large. If these logistics are not adequately and quickly resolved, retail competition cannot be fully supported, will not be fully functional, and will not produce net benefits. A more reasonable schedule would scale back the participation in the first phase to accommodate the opportunity for learning. Proceeding with full implementation of retail access should come only after we have learned how to get it right. The experience of California is consistent with this view. California's retail access program, for which planning began in 1995, is scheduled to begin in 1998. It will also start on a much smaller scale than is envisioned in Arizona. In contrast to the Proposed Rules' proposal to begin its first phase in 1999 by allowing 20 percent of 1995 statewide retail load to participate in retail access, California will initially allow 3.5 percent of statewide load, or about 1,800 MW into the retail access program.

Seventh, while the Proposed Rules address stranded cost recovery, several critical issues are unresolved. First, the Proposed Rules provide little guidance as to how stranded cost recovery will be achieved. Neither a mechanism nor a time frame for recovery is given. Equally, the Proposed Rules direct that utilities take appropriate steps to mitigate their stranded costs but do not specify what criteria will be used to assess whether a utility has satisfactorily met this obligation. While it is reasonable to require mitigation, an appropriate standard must be defined. In addition, the Proposed Rules list a variety of factors that should be used to determine the magnitude and mechanisms for stranded cost recovery but is ambiguous as to how or why these factors will be applied. Progress towards solving the complex issues in structural changes will be greatly enhanced by early resolution of the stranded cost issue.

Eighth, the Proposed Rules' provisions for a solar subsidy are arbitrary and conflict with the Commission's otherwise stated objective to provide customers greater flexibility in choosing their electric supply. There has been no economic evidence presented that the solar program, as presently devised, will produce any net benefits for Arizona's ratepayers. Nor is it clear that the program will actually foster the commercial development of solar technology. In fact, the use of a quota system to subsidize solar development will likely distort markets for solar and other renewable resources. This issue has no clear linkage to the restructuring issue and should be settled in a separate proceeding through careful analysis of the costs and benefits of alternatives.

Q. WHAT WILL HAPPEN IF THE COMMISSION PROCEEDS WITHOUT RESOLVING THE ISSUES THAT YOU HAVE JUST IDENTIFIED?

A. Mistakes will be made and that some of them will be costly to electric suppliers, electric customers and to the state of Arizona as a whole. Reliable electric services produced at least cost and provided to all customers on an efficient and equitable basis will come through careful planning, analysis, design and cooperation. These are unlikely to result from haste or failure to resolve fundamental issues at the outset.

IV. OVERVIEW OF THE PROPOSED RULES

Q. COULD YOU BRIEFLY SUMMARIZE YOUR UNDERSTANDING OF THE PROPOSED RULES?

A. Yes. The Proposed Rules require retail competition in the state to begin by January 1, 1999. Although initially the eligible load for retail access is restricted, the Proposed Rules call for full retail access for all customer classes by 2003. The Proposed Rules also mandate that prior to 2003, pre-specified target levels for eligible residential customer participation be achieved, and that industrial customer retail access be capped.

Q. WHAT IS RETAIL ACCESS?

A. Retail access, or direct access, refers to providing retail consumers with a choice of electric suppliers and services. Because the electricity industry has historically been dominated by large, vertically integrated monopolies that operate exclusively within a geographic area, the advent of consumer choice introduces competition into markets previously closed to competing suppliers.

Q. WHAT ARE THE OTHER IMPORTANT COMPONENTS OF THE PROPOSED RULES?

A. As part of the transition, new suppliers of electric services are free to compete with existing utilities for market share, but all firms providing generation and transmission services must obtain a Certificate of Convenience and Necessity to operate in the state. Existing utilities must unbundle their rates so that pricing of electricity services among competing suppliers is comparable and transparent. However, incumbent utilities must also bear the additional responsibility of offering traditional, bundled service at cost-of-service rates until the ACC determines that competition has been "substantially implemented." As part of the Proposed Rules, distribution of electric service will remain a regulated monopoly service.

Q. DO THE PROPOSED RULES ADDRESS OTHER TRANSITION ISSUES?

Yes. They also address stranded cost and the funding of social programs. The Proposed Rules specify that utilities shall be allowed to recover their stranded costs. The Proposed

Rules define "stranded cost" and note that utilities must make every attempt to mitigate as many of these costs as possible.

Social programs that are presently administered by utilities, such as DSM, low income, environmental, renewables and nuclear power plant decommissioning will continue to be funded by all consumers through a non-bypassable charge. The Proposed Rules also develop provisions for in-state reciprocity and create a minimum solar resource requirement for energy purchases in the state.

V. THE COSTS AND BENEFITS OF RETAIL ACCESS IN ARIZONA

A. The Role of Cost-Benefit Analysis in Retail Access

Q. WHY WOULD IT BE DESIRABLE TO PURSUE RETAIL COMPETITION IN ELECTRICITY?

A. Retail competition is desirable to the extent that it can be expected to produce net economic benefits. Net benefits is the surplus of benefits over the cost of achieving them. If there are net benefits, the state as a whole can be better off as a consequence of retail access. Related to the issue of whether there are net benefits overall is the question of distribution of benefits — that is, who receives the benefits and are these benefits at the expense of increased costs that are borne by others? There may be some consumers who are harmed by retail access even if the overall net benefits to the state are positive.

Q. UNDER WHAT CIRCUMSTANCES WILL THERE BE POSITIVE NET BENEFITS OF RETAIL ACCESS?

A. For net benefits to accrue there must be an increase in efficiency. That is, there must be fewer *real* resources used in the provision of a unit of electricity (technical efficiency), or the electricity produced must be priced so that society's resources are put to their most highly valued use (allocative efficiency), or the industry must evolve to incorporate new products and methods of production (dynamic efficiency).

Q. WHY DO YOU STRESS THE DESIRABILITY OF FOCUSING ON NET BENEFITS TO EVALUATE THE COMMISSION'S PROPOSED RULES?

A. It emphasizes the overall effect of retail access, rather than the effect on a specified group. Many customers would individually benefit from direct access if it gave them the opportunity to shift cost responsibilities to others. However, hurting some customers or stockholders to benefit others does not create value for the state as a whole. Restructuring rules should focus on producing real efficiency so that all parties can be better off.

Q. HAVE YOU REVIEWED THE ECONOMIC IMPACT STATEMENT (EIS) WHICH WAS ATTACHED TO THE COMMISSION STAFF'S OCTOBER 1, 1996 RULE FILING?

A. Yes, I have. The EIS lacks substance and even its surface level treatment fails to touch on a number of important elements. For example, the authors assume that competition will reduce the costs of electricity without any analysis of where efficiency benefits will come from or recognition that many customers are very likely to see rate increases, especially in early years. It ignores the potential tax losses to state and local governments, as well as the magnitude of the investments in metering and information processing which will be required. It also inadequately treats the potential effect of competition on reliable and predictable electric service and prices.

Q. PLEASE ELABORATE ON THE FAILURE OF THE EIS TO ADEQUATELY ASSESS BENEFITS.

A. The analysis assumes that competition will lower prices. The basis for the assumption is not provided, nor is an estimated level of price reductions calculated. Given that the Proposed Rules do not outline the structure or mechanics of the proposed future market, it is not surprising that the economic analysis is superficial. If any economic analysis of retail competition is to be relied on by the Commission, it must identify achievable efficiencies, quantify them, and compare them with the costs of achieving them. The EIS fails to do any of these things.

Q. WHAT ABOUT THE COSTS? DOES THE EIS ADEQUATELY IDENTIFY AND QUANTIFY THE COSTS OF TRANSITION TO A COMPETITIVE MARKET?

A. No. The EIS has not done an adequate job of identifying or quantifying either the cost of transitioning to the new regime or the operational costs of the new regime.

Q. CAN YOU PLEASE ELABORATE?

A. There are two categories of costs one must consider in proposing a change from the status quo. First, the costs of getting there (i.e., the one-time transition costs) and, second, the routine cost of operating under the new regime (i.e., the cost of running and managing the new regime once we get there).

Q. HOW IS THE EIS INADEQUATE IN THESE REGARDS?

A. The EIS mentions some cost categories in passing, mixing — and confusing — the two cost categories without providing even a rudimentary analysis of their potential magnitude.

Q. WHAT ARE THE SIGNIFICANT COSTS OF TRANSITION TO THE NEW REGIME?

A. One must include the costs associated with developing and implementing a vertically disaggregated transmission network with appropriate safeguards for system reliability, developing and implementing the structure of a competitive market, fitting hundreds of thousands of customers with hourly load meters or developing class, sub-class, and individual customer load profiles, developing new billing and customer information systems, creating systems to facilitate record-keeping and settlements among buyers and sellers of energy, developing systems to facilitate transactions among multiple players, and developing new regulatory systems and tools. This is not close to a comprehensive list, but merely the tip of the iceberg.

Q. WHAT ABOUT THE SIGNIFICANT COSTS ONCE THE TRANSITION IS COMPLETED?

A. The cost of maintaining and operating a complex market and new regulatory systems is significant. The absence of vertical integration will require new institutions to coordinate generation, transmission and distribution. Customers will find the choices, and the information required to make these choices, a great burden on their time and resources. Price volatility will increase consumer risk. None of these costs are clearly detailed or quantified by the EIS.

Q. WHY IS AN APPROPRIATELY CONDUCTED COST-BENEFIT ANALYSIS OF RETAIL ACCESS NECESSARY?

A. The primary criterion that should be used in assessing any change in public policy is a legitimate belief that the sum of all the benefits will exceed the sum of all the costs. Furthermore, it is vital that all the benefits and costs be considered and that they be assessed in a thorough and consistent manner. For there to be a net benefit, there must be a net gain in efficiency.

Q. HOW WOULD SUCH A PROPER ECONOMIC ANALYSIS BE CONDUCTED?

A. It would be necessary to distinguish and measure the costs and benefits in each of at least two cases: one case in which the basic structural change is imposed; and another, the "base case," which is without the structural change. There are three steps in the process. The first is to decide on the appropriate base case for the analysis. Changes already underway in an industry should obviously be treated as already being included in the base case, since the objective is to ascertain whether the proposed change will itself create benefits beyond those that would occur without it. The second step is to assess the efficiency improvements which the change is likely to make. The third step is to assess the net benefits or costs that would be incurred as a result of the transition to the new regime. More accurately, the net present value of efficiency gains due to the change from the base case, less the net present value of transition costs, will provide an estimate of the overall net benefits of the change.

Q. SHOULD COSTS AND BENEFITS BE QUANTIFIED IN DOLLAR TERMS?

A. Yes. All the costs and benefits which *can* be quantified in dollar terms should be, however, there will remain some effects that can only be considered in qualitative terms.

Q. WHY IS IT IMPORTANT TO INCLUDE THE CHANGES THAT ARE ALREADY OCCURRING IN THE BASE CASE FOR EVALUATING THE PROSPECTIVE BENEFITS OF RETAIL ACCESS?

A. These changes are occurring anyway, regardless of whether retail access is instituted. They do not involve extensive institutional restructuring. We have an understanding of the effects they will have. It is, therefore, reasonable to ask the proponents to address whether the additional benefits of retail access will be worth the additional costs.

B. Efficiency Will Likely Increase Without Retail Access

Q. ARE THERE DEVELOPMENTS, OTHER THAN RETAIL ACCESS, THAT ARE CURRENTLY AT WORK TO ENHANCE THE EFFICIENCY OF ELECTRICITY MARKETS IN ARIZONA?

A. Yes. The electric utilities in this region are already in the process of implementing comparable open-access transmission tariffs, with the result that purchases, sales and interchanges of power and energy will be even more efficient in the future. In addition, the Commission has implemented regulatory changes, including forms of Performance-Based Rates (PBR) for both APS and Tucson Electric Power Company (TEP), with the likelihood that these utilities will become even more efficient in their operations and purchases and sales of power and energy. Moreover, improvements in generation technology are lowering the cost of producing power throughout the world.

Q. WHY WILL OPEN-ACCESS TRANSMISSION TARIFFS PRODUCE BENEFITS?

A. The FERC has implemented a policy of open access to transmission at the wholesale level on a non-discriminatory basis which will likely enhance the ease of transmission access and, thereby, the level of competition in wholesale markets. Arizona, with a high concentration of interstate transmission, should see benefits from expanding an already highly competitive wholesale market.

Q. WHAT WILL BE THE EFFECT OF ADOPTING FORMS OF PBR IN ARIZONA?

A. The Commission has implemented PBR programs for both APS and TEP. Both the APS Rate Reduction Agreement and TEP's rate freeze until the year 2000, provide strong incentives to be efficient in all aspects of operations, purchases and sales of power. The APS Rate Reduction Agreement provides for a sharing of benefits if APS is able to reduce its costs. Customers will be rewarded with a return of 55 percent of the gains from cost reductions in the form of lower rates each year of the program.

Q. WHAT IS THE SIGNIFICANCE OF RECENT ADVANCES IN GENERATION TECHNOLOGY?

A. Reduced heat rates and lowered capital cost promises greater efficiency and lower prices as new capacity is added in the region. In many cases, new capacity will be able to produce electricity for half of the cost of existing units. This promises to reduce costs over the coming years, even if there were no retail access.

C. Any Benefits from Retail Access in Arizona Are Likely to be Long-Term

Q. DO YOU BELIEVE THAT THERE WOULD BE SHORT-TERM REDUCTIONS IN GENERATION COSTS AS A RESULT OF IMPLEMENTING RETAIL ACCESS?

A. No, and neither the Proposed Rule nor the accompanying EIS identify any. It is likely that the present economic dispatch and wholesale trading within the region already result in the lowest cost generation resources being used to produce the needed quantities of power and energy. Utilities are tied together by long-term bilateral contracts for power and transmission services, and there are robust mechanisms in place within the WSCC for short-term economy trading. The electric utilities of Arizona routinely engage in purchases and sales of energy when there are savings to be gained from doing so. APS, for example, has five employees engaged full time in power marketing to make purchases and sales that reduce costs. New capacity is unlikely to play a significant role in the short-term. It will be a number of years before large increases will be required in the generating capacity in Arizona. The Commission Staff has recently completed a review of APS's Integrated Resource Plan (IRP) filings. That process indicated that APS will require only modest additional to capacity over the next several years. The next major capacity additions will not be needed until the year 2004.

Thus, it is unlikely that retail access will exploit previously untapped sources of low-cost generation, although it may redirect the benefits of that low-cost generation to particular sets of customers.

Q. WILL RETAIL ACCESS PRODUCE NEAR-TERM COST REDUCTIONS IN TRANSMISSION COSTS?

A. Not that the Commission or Staff have quantified. As with generation, it is unlikely that retail access will achieve near-term cost savings. The same generators are likely to be dispatched in the same way, meaning that electricity flows over transmission links will be unchanged from the base case.

Q. ARE THERE EXPECTED COST REDUCTIONS IN DISTRIBUTION UNDER A RETAIL ACCESS PROGRAM?

A. No. There is no evidence that retail access will reduce the operation and maintenance, planning, system design or incremental construction costs of distribution. Under the

Proposed Rules, distribution will remain a regulated local monopoly. The local service provider may be regulated under PBR instead of traditional cost-based regulation, a process that is already under way at both APS and TEP. Since PBR already is becoming Commission policy for the major electric utilities under its jurisdiction, even without restructuring, it is part of the base case. For current customers, electricity will be delivered over the same poles and wires. Metering and billing costs are unlikely to fall, and, in fact, are likely to rise if more sophisticated meters are required.

Q. IS THERE ANY AREA IN WHICH RETAIL ACCESS IS LIKELY TO HAVE A SIGNIFICANT NEAR-TERM BENEFIT?

A. Yes. A competitive retail market is likely to improve retail pricing. Prices would be driven by competition to reflect more closely the costs of serving customers. There would likely be a larger number of prices (reflecting differences in the costs of serving customers) and these prices would be more likely to reflect specific time and type of use characteristics. Changes in pricing unaccompanied by changes in cost will benefit customers who cost less than average to serve, but will increase costs for customers with relatively low consumption, poor load factors, or other characteristics that result in cost of service that is above average levels.

Q. YOU HAVE INDICATED THAT NEAR-TERM PRODUCTIVE EFFICIENCY BENEFITS FROM RETAIL COMPETITION ARE LIKELY TO BE MODEST. DO YOU HAVE THE SAME VIEW OVER THE LONGER-TERM?

A. No. I believe that over the long-term, retail competition will promote generation efficiency as new facilities are added and existing facilities are made more efficient. If the generation market is allowed to function with few regulatory controls, it is likely to produce increased efficiency to the benefit of customers generally.

Q. WHAT DO YOU BELIEVE RETAIL COMPETITION MAY ADD TO EFFICIENCY IN TRANSMISSION?

A. If it results in a mechanism to better reflect transmission marginal costs in retail prices and/or to produce stronger incentives to overcome transmission bottlenecks, it could produce substantial long-term benefits.

Q. WHAT ABOUT EFFICIENCY BENEFITS AT THE DISTRIBUTION LEVEL IN THE LONG-TERM?

A. Since much of distribution would remain a regulated monopoly, the benefits are not as obvious. However, there are some possible candidates. Better metering may be cost effective over the long-term. I believe that consumers will be willing to invest in information and energy management tools that will allow them to react to changing price signals and service availabilities. Competition is likely to produce greater information concerning and sensitivity to customer needs.

Q. COULD SOME OF THESE PRICING EFFICIENCIES BE ACHIEVED WITHOUT RETAIL ACCESS?

A. Yes. Flexible or real-time pricing, as well as smaller and more homogeneous rate classes are all means of improving price signals. With price flexibility, utilities can focus rate changes on customers most likely to be sensitive to prices and thereby achieve a large share of available benefits without the cost of restructuring all rates. However, competition is likely to be more effective in the long run than incremental regulatory changes in moving pricing to marginal or market-cost levels for the majority of customers.

Q. IS RETAIL COMPETITION LIKELY TO CREATE DYNAMIC EFFICIENCY (THE ABILITY OF THE INDUSTRY TO UTILIZE NEW PRODUCTS AND METHODS OF PRODUCTION)?

A. Yes. At least in the long-term. Although it is unlikely that direct access in Arizona will produce innovations in how electricity is produced, it can be expected to result in many new products and services offered to customers. Competition will motivate sellers to offer as many varieties of service as customer demand will support. Although this process will take some time to evolve, it is likely to produce some benefits.

D. There Are Substantial Potential Costs of Retail Access if Implemented at This Stage

Q. WILL RETAIL ACCESS REQUIRE SUBSTANTIAL INSTITUTIONAL CHANGES WHOSE COSTS SHOULD BE CONSIDERED IN DECIDING HOW AND WHEN TO IMPLEMENT IT?

A. Yes. Restructuring decisions will change the amount and incidence of costs and benefits. Some of the important changes that must be assessed as part of developing a retail access program include the following:

- Change in the mechanism for decisions relating to transmission operations, expansion and pricing.
- Change in the reliability of the electric system. — Changing the structure of the industry will alter the responsibility and authority to keep service reliable. There may be changes in either the level of reliability or the costs of achieving it.
- Change in the rates charged and services offered to the various classes of customers. — Some consumers will pay more, and others will pay less. (e.g., What services will be bundled with distribution wires and which will be left to markets?)
- Change in the products offered. — For example, there will be shifted cost responsibilities and inefficiency unless ancillary services are properly metered and priced.
- Change in the competitive position of utilities and states. — This will be affected by the development of regional/national markets, and involves decisions such as whether there is reciprocity among states, and whether state programs are compatible with each other.
- Change in the obligation to serve. — Who will bear the obligation to serve for competition services (e.g., generation) and how will that entity be compensated?
- Changes in the allocation of risks. — Market prices, for example, are likely to shift immediate risks such as inflation or shortages to consumers.

- Changes in the incentives for cooperation among competing suppliers of bulk power.
- Change in environmental, conservation and social programs. These programs are likely to be affected either in scope or in who bears the burden or receives the benefits.
- Changes in the incidence and magnitude of taxes generated by the electric industry.
- Change itself. — There will be significant transition costs in designing and implementing the details of a new system.

I will discuss some of these changes later in my testimony. For now, it is important to stress that these changes will impose costs that are likely to be significant, and the Proposed Rules and their accompanying economic impact statement must sufficiently address and assess these costs that are a consequence of moving toward retail access.

VI. THE DISTRIBUTION OF THE COSTS AND BENEFITS HAS NOT BEEN CONSIDERED

Q. ARE THERE EQUITY AS WELL AS EFFICIENCY CONSIDERATIONS THAT ARISE IN EXAMINING THE COSTS AND BENEFITS OF RETAIL ACCESS?

A. Yes. While economics generally concentrates on efficiency, in public policy we recognize that it is important to determine the *distribution* of the costs and benefits across customer segments. If retail access brings positive net benefits, neither the costs nor the benefits will be distributed evenly across every customer class or region of the state. Considerations of equity arise in evaluating to whom the costs and benefits of retail access accrue.

Q. COULD YOU ELABORATE ON THE EQUITY CONSIDERATIONS THAT WILL ARISE IN MOVING TOWARD RETAIL ACCESS?

A. Yes. I can provide examples of these considerations.

One area of concern is that benefits of competition may accrue primarily to large and aggressive customers. In a competitive environment, each customer is on his own to choose the right supplier and bargain for the best prices available. Under these circumstances, it is likely that large, sophisticated, well-informed, and aggressive customers will benefit from their new ability to shop around and to play one supplier against another for the best deals available. Furthermore, such customers are likely to ask for — and get — customized services well-suited to their individual needs by buying unbundled services from alternative suppliers to lower their overall energy service costs.

Q. WHAT EQUITY ISSUES DOES THIS RAISE?

A. Currently all customers in a given class are offered standardized (and bundled) services at pre-determined tariffs reviewed and approved by the regulators. They do not have the option to choose their service provider, nor the option to ask for customized (and potentially unbundled) services. Similarly, most customers can not now bargain for better prices. A standard bundled service at tariffed rates protects the smaller, less sophisticated, less-informed, and less-motivated customers by offering them all they need at an average price.

One way to address (but not necessarily solve) this problem is to require suppliers to continue providing small customers with the option to buy standardized, bundled service at standardized tariffs. Unfortunately, as will be discussed in Section VIII below, the combination of the ability of customers to shop with a fixed priced tariff is very likely to transfer increasing costs to the regulated supplier, thus raising the standardized tariff rates.

Q. PLEASE PROVIDE YOUR SECOND EXAMPLE OF AN EQUITY CONSIDERATION.

A. The transition to a competitive retail market is also likely to lead to higher rates for some customers, most of whom currently enjoy subsidized, below-market prices. For example, most small residential customers with poor load factors pay the same rates as larger residential customers with high load factors, even though the unit costs of serving the former group are considerably higher than the latter. Current regulations protect high-cost customers by averaging costs across all customers in a class.

In a competitive environment, such hidden price subsidies may be difficult, if not impossible, to sustain. Consequently, the small- and low- load factor customers' rates will tend to rise. Furthermore, many of the disadvantaged customers may be fixed-income or low-income customers. Such an outcome will still be economically efficient, but may be perceived to be inequitable, or politically unacceptable.

Q. WILL YOU SUMMARIZE YOUR THIRD EQUITY EXAMPLE?

A. Yes. Competing customers (i.e., customers who are each other's competitors in the market) in any given service area currently buy electricity at generally the same price from a single supplier. However, in a competitive environment, some will do better than others. This may result because some are larger or are more aggressive, better shoppers, or are more informed, or are cheaper to serve, or are simply located in an area many suppliers desire and are able to serve. Regardless of the reasons, this outcome may lead to a relative advantage for some customers over their competitors. While price differences should be acceptable if they reflect market outcomes, this result may also appear as inequitable, especially when one customer's advantage is solely the result of size or geography.

Q. PLEASE DESCRIBE A FOURTH POTENTIAL EQUITY CONCERN.

A. Currently, electricity costs charged to customers tend to remain fixed for long periods of time because of the regulatory process. Furthermore, most customers pay fixed prices for all the kilowatt hours purchased. These two provisions of the current pricing regime provide customers with price stability and predictability that competition will not match. Customers generally know what the rates are and can count on having these fixed prices for months or years at a time.

In a competitive environment both price stability and predictability will be reduced. Suppliers will be free to lower or raise their prices as competitive market conditions dictate, and market prices are likely to change from hour-to-hour and from day-to-day.

Of course, customers who do not wish to be confronted by variable prices can enter into fixed-price contracts with their supplier or a third party using instruments such as contracts for differences (CfD), but such price guarantees in the future will be provided at a price premium and will no longer be available to all customers as a standard feature included as part of their regulated tariffs.

Q. HAS ANY ATTEMPT BEEN MADE TO ANALYZE THE RELATIVE DISTRIBUTION OF THE COSTS AND BENEFITS OF RETAIL ACCESS?

A. Yes. The Tellus Institute and the Wisconsin Energy Conservation Corp. have analyzed the impact of California's industry restructuring proposal on residential consumers. A detailed analysis of some 90 sensitivity cases led the report to conclude that without aggregators, residential customers would likely experience negative benefits under the California retail access proposal. While I have not reviewed in detail the methodology used to perform the cost-benefit analysis and, therefore, do not pass on the validity of the report's findings, it is likely, as I have stated elsewhere in this testimony, that competition will be detrimental to some parties.

Q. DR. LANDON, WHAT ARE YOUR RECOMMENDATIONS WITH RESPECT TO COST-BENEFIT ANALYSIS AND THE DISTRIBUTION OF NET BENEFITS ACROSS CUSTOMERS?

A. The Proposed Rules should be preceded by a careful economic analysis that: 1) determines whether there are net benefits associated with retail access in Arizona; 2) assesses the relative gains and losses that various customers classes will experience as a result of initiating greater competition in electricity markets; and 3) establishes the mechanisms and timetables which will best realize net benefits and preserve equity.

VII. COMPLEX LOGISTICS OF THE TRANSITION TO RETAIL COMPETITION ARE NOT ADDRESSED

A. The Technical Aspects of Retail Access Are Not Well Developed

Q. ASSUMING THAT AN ECONOMIC ANALYSIS DEMONSTRATES THAT THERE ARE POSITIVE NET BENEFITS TO RETAIL ACCESS, DO YOU BELIEVE THE PROPOSED RULES ADEQUATELY ADDRESS THE STEPS THAT MUST BE TAKEN TO COMPLETE A TRANSITION TO RETAIL ACCESS IN THE STATE OF ARIZONA?

A. No, I do not. There are at least eight specific technical issues that may present logistical problems, and which I believe the Proposed Rules do not adequately address. These are:

1. Deciding what method of transmission governance will be used, and working out the details of how it will work and be priced;
2. Developing protocols for system reliability;
3. Developing an institution or mechanism that will determine the market clearing price for electricity in real time.
4. Determining a method for supplying real time metering, customer billing and load profiling. This involves developing, testing, and implementing workable scheme(s) for hourly load metering (or load profiling, as appropriate); and upgrading customer information systems (CIS) capable of handling the increased complexities associated with variable electricity pricing;
5. Developing a workable system for the handling of settlements among multiple generators and suppliers and for resolving disputes that may arise;
6. Developing a way to monitor and price ancillary services;
7. Developing a set of rules to address reciprocity issues;
8. Developing mechanisms to determine and recover stranded costs.

I will address each of the first seven issues below. A more detailed discussion of stranded cost mechanisms is addressed in Section X.

B. Deciding on Transmission Options

Q. CAN YOU BRIEFLY EXPLAIN WHAT NEEDS TO BE DONE TO RESOLVE TRANSMISSION ISSUES?

A. The Commission raises the possibility of the formation of an Independent System Operator (ISO). FERC Order No. 888 invokes a comparability of service standard that moves part of the way toward vertical separation. An ISO would actually separate transmission ownership from control. Whether an ISO is desirable and, if so, working out the details of how it should be set up, is a contentious and complex question.

Q. IF THE FORMATION OF AN ISO OR EQUIVALENT SYSTEM IS ESSENTIALLY A FERC-RELATED ISSUE SPELLED OUT IN ORDER 888 AND 889, WHY SHOULD THE COMMISSION, WHOSE MAJOR RESPONSIBILITY IS RETAIL REGULATION, BE CONCERNED WITH TRANSMISSION-RELATED MATTERS?

A. It is true that FERC will have much to do with the formation of systems to facilitate the transparency and regulation of transmission access and pricing. However, transmission governance is not strictly a FERC-related issue. Without a well-designed and functioning system, there is no way to clear the market in real time and set the price that will balance supply and demand. A functionally working bulk power market is just as important to the efficient operations of the retail market as it is essential to clear the wholesale market and regulate transmission pricing. An essential part of developing a beneficial direct access system will include getting system governance and pricing rules right.

Q. IF THE COMMISSION WERE TO REQUIRE THE FORMATION OF AN ISO, WOULD DEVELOPING ONE BE RELATIVELY STRAIGHT FORWARD AND NON-CONTROVERSIAL?

A. No. The technical difficulties associated with developing and testing a fully operational ISO are daunting, time consuming, and expensive to overcome. While the Proposed

Rules acknowledge the potential desirability of an ISO, it is woefully vague on how it will be financed, developed or operated. Much more attention needs to be devoted to this critical issue.

In California, for example, the design of the proposed ISO has taken enormous effort. The joint development of the ISO and Power Exchange (PX) is expected to require $250 million to fund its implementation and start-up costs over the next 18 months. Despite numerous workshops, working groups, hearings and analysis thus far in California, the specific workings of the ISO are not yet fully defined. There are still substantial technical issues that need to be addressed before California will be able to reach its goal of implementing limited retail access in 1998. Since FERC has jurisdiction in the creation and operation of the ISO, the Commission would have to coordinate with the FERC to develop protocol and operational procedures for it to work. The Proposed Rules do not reflect the scale and significance of these issues.

Q. WHETHER OR NOT THERE IS AN ISO, ARE THERE TRANSMISSION PRICING ISSUES THAT NEED TO BE RESOLVED TO CORRECTLY IMPLEMENT RETAIL ACCESS?

A. Yes. First, there is the question of how the fixed costs of the transmission system will be recovered. Will current native-load customers have to bear all of these costs or will all users of the system, including all sellers and wheeling-through customers, have to make some contribution to the fixed costs of the system? Another key issue is whether the transmission should be priced on a region-wide basis or over smaller areas. Should there be, for instance, a single rate to transmit electricity throughout Arizona or should the rate be different between each load and generating area? Should the price rise when there are constraints on a line such that all users cannot be accommodated? How will transmission owners be compensated for loop flow? These are examples of the areas that need consideration.

C. Maintaining System Reliability

Q. ARE THERE ALSO IMPORTANT ISSUES RELATIVE TO HOW NEW TRANSMISSION LINES WOULD BE BUILT AND FINANCED IN A RESTRUCTURED MARKET?

A. Yes. A mechanism must be developed to determine when new transmission capacity will be needed and who will pay for it. An obvious problem is that a new transmission line may increase or decrease the market value of generators and the transmission capacity of other lines. If prices rise with congestion, the owner of a constrained line may be reluctant to relieve the constraint. Adding lines will also change the prices that each generator can get for its output. A method for making these decisions efficiently and fairly will be very important in determining both the level and allocation of costs and benefits from investing in new transmission facilities.

Q. WHAT ABOUT MAINTAINING SYSTEM RELIABILITY?

A. That is another critical issue which is barely mentioned in the Proposed Rules. The Proposed Rules' discussion on spot markets and the ISO is addressed in six lines of text. Service quality and system reliability issues are left to a working group to consider. The Proposed Rules says nothing about who will be responsible for system reliability under a restructured market other than to acknowledge that electric service providers should comply with the reliability standards and practices established by organizations such as the Western Systems Coordinating Council. Leaving such critical matters undefined and unresolved gives me little confidence that the Commission fully recognizes their significance.

Q. WOULDN'T COMPETITIVE FORCES TAKE CARE OF RELIABILITY?

A. Competition can address reliability but only when the proper mechanisms are developed to provide accurate price signals and adequate safeguards are provided to reward the investors for assuming risks in an unregulated market. The Proposed Rules do not address these issues.

Q. HOW COULD SYSTEM RELIABILITY BE MAINTAINED IN A RESTRUCTURED MARKET?

A. Two things must take place. First, there must be a command and control system that is run by an entity which has the resources, information, and authority to monitor and control power generation and flows throughout the area. The job of coordinating the area system reliability aspects of generation, transmission, and distribution must be undertaken by a central entity. Utilities have historically cooperated in performing this function over the region and have provided it themselves within their own areas. However, if utilities will not continue to serve in this role, then a new system for monitoring and controlling the system must be developed. The competitive market will no longer be composed of a relatively small number of integrated utilities that can be depended on to voluntarily share information and act upon it to maintain system reliability. Instead, many new suppliers will enter the generation market, and their hourly actions will need to be coordinated. An institution must be created that is capable of collecting and acting on information about system conditions. Second, in the long-run, sufficient market incentives must be developed to encourage adequate investment in generation and transmission. To maintain electrical system reliability in a decentralized and competitive market, investors receive strong price signals that investments in generation and/or transmission systems will be profitable if they are needed to relieve anticipated shortages and/or constraints. As it stands, the Proposed Rules do not provide any mechanism to supply the information and authority to keep the lights on in the short-term, nor any long-term mechanism for providing the correct price signals to potential investors.

Q. IS THERE A COST ASSOCIATED WITH ANY REDUCTION IN THE RELIABILITY OF ELECTRIC SERVICE?

A. Yes, there is. Electric utilities, including APS, have built and operated their systems to conform with a high standard of reliability. Customers place a high value on avoiding outages and on continuous and reliable service. Just a small reduction in reliability could have substantial costs for Arizona electric consumers.

There have been numerous studies on the value customers place on avoiding outages and, conversely, the compensation customers would be willing to accept if forced to endure outages. A conservative estimate of the amount residential customers would be willing to pay to avoid an unanticipated service interruption of an hour's duration is \$5.00 to \$10.00 per lost kilowatt-hour. Of course, the cost varies with the time of day and the season of the year. During an on-peak hour in the summer, the cost of unserved energy may be \$20.00 to \$30.00 per kilowatt-hour. In the U.K. system, there is a penalty provision that translates to approximately \$3.75 per lost kilowatt-hour of residential service. Some industrial and commercial electric consumers may be even more sensitive to the costs of outages.

D. Developing A Real-Time Pricing Mechanism

Q. CAN YOU COMMENT ON THE NEED FOR A MECHANISM THAT PROVIDES AN ELECTRICITY MARKET CLEARING PRICE?

A. A real-time market clearing price is a quintessential requirement of a smoothly functioning competitive market. A market price helps to balance supply and demand in real time and provides a mechanism for settlements among suppliers. The market price provides incentives to both the generators and suppliers (and their customers) to keep the system in balance. For this to happen smoothly and efficiently, two things are needed:

First, a scheme must be developed for determining a market price in real time; and

Second, a system must be available to convey the variable market prices to suppliers and customers who may be able to modify their production or usage in response to changing prices.

The Proposed Rule does not offer any substantive analysis of these issues.

E. Developing Metering, Customer Billing, and Load Profiling Systems

Q. DOES THE DEVELOPMENT OF A MECHANISM THAT DELIVERS PRICES BASED ON TIME OF USE REQUIRE ANY CHANGES IN CUSTOMER METERS?

A. Yes. Currently, most customers buy their electricity based on monthly kilowatt-hour rate which is calculated using average historical costs, and are completely oblivious of the actual cost that their consumption entails on the system that serves them. The current rates for all kilowatt hours of consumption are deliberately set to recover the average costs associated with serving the class as a whole. Under this method, some customers pay more than the costs they impose, while others pay less.

In a competitive environment most — if not all — customers will pay rates that more closely reflect the true costs that they impose on the system. For this to happen, they must be exposed to variable market prices. Customers should be given the opportunity to respond to variable prices by altering their usage if they choose to do so. This requires that their consumption be monitored and recorded on an hour-by-hour basis for billing purposes. Consequently, each customer, at least in theory, should be fitted with an hourly time-of-use meter.

Q. WOULD THIS NEW REQUIREMENT NECESSITATE HOURLY TIME-OF-USE METERS FOR ALL CUSTOMERS?

A. Probably not in the near-term. Because of the cost, it may not be economic — nor necessarily desirable — to fit all customers with hourly time-of-use meters immediately. Re-metering all of the customers currently served by regulated utilities in Arizona could require hundreds of millions of dollars of investment. While metering small customers is expensive, it is also accurate. It conveys accurate price signals to customers who can respond to these signals by altering their consumption patterns to reduce their costs. It also gives distributors and suppliers accurate information to facilitate settlements for the provision of ancillary services. Load profiling may be less expensive, but it is also less accurate, does not give customers incentives to change load patterns, and may make it more difficult for distributors to be correctly compensated for ancillary services. A larger number of profiles would be necessary to fit a variety of customer situations. There would certainly be controversy over customer assignment to specific profiles. On balance, detailed analysis will be required to determine the relative merits of metering versus load profiling for small customers. The resolution over when to use metering or load profiling is likely to differ among utilities and between states.

Q. WHICH CUSTOMERS IN ARIZONA WILL BE REQUIRED TO BE METERED USING HOURLY LOAD METERS?

A. That is a good question, which the Proposed Rule does not answer. Deciding which customers should be fitted with hourly load meters and which ones may be placed on load profiles is not a trivial matter. Nor is it a minor matter to design the appropriate number of load profiles to fit different customer groups for billing purposes. There are a number of other technical issues that must also be resolved prior to instituting load profiles such as deciding who bears the risk of potential errors in the design of load profiles or errors resulting from assigning customers to wrong load profiles. Generally speaking, the cut-off point should be decided by considering the cost of purchasing and installing a sophisticated hourly load meter versus the benefits that the utility and customers may receive from their ability to respond to variable prices.

Q. WHAT ABOUT COMPLICATIONS IN CUSTOMER BILLING?

A. As I indicated previously, producing accurate customer bills using recorded data from hourly load meters or from load profiles is important and complex. Current customer information systems (CIS) at most U.S. utilities are not designed to handle the extra complexities associated with hourly load data and variable hourly prices for small customers. Furthermore, most existing CISs simply cannot be modified or upgraded to handle this additional complexity. Entirely new systems, using new computer platforms and sophisticated software are needed. Although the technology to do so is available, it takes considerable time, resources, and effort to develop and test fully functional systems. To assume that such systems can be developed quickly or inexpensively to handle the requirements of competitive retail market is unrealistic.

Q. ARE YOU SUGGESTING THAT THE TECHNOLOGY TO UPGRADE THE CURRENT UTILITY CIS IS NOT AVAILABLE TO HANDLE CUSTOMER BILLINGS UNDER RETAIL ACCESS?

A. No. I am simply stating the fact that upgrading current CIS is not trivial, nor will it be inexpensive, or something that can be done overnight.

Q. CAN YOU ELABORATE?

A. Most utilities in the US, those in Arizona included, currently use CIS that were developed years or decades ago based on what was then considered state-of-the-art mainframe computers and software. These systems have been tinkered with over the years to handle growing numbers of customers, and a proliferation of rates. Most current systems are barely adequate to handle what they do, namely producing a monthly bill for customers which consists of a single kWh reading for the month times a fixed price for electricity for all the hours. Taxes and customer charges are also added to produce the final bill.

Under real-time retail access, the CIS has to keep track of 720 kWh consumption readings — one for each hour in the month — and multiply each kWh by its corresponding hourly price (assuming hourly variable prices are used). Ninety nine percent of the current generation of utility CISs will simply not be able to do this.

It will take new computer platforms and new software to do this in nearly all cases. And you cannot expect to have such a new system to be up and running overnight. Furthermore, since the utility's financial viability — as well as its credibility with the customers — is at stake, a new system should be fully tested and debugged before it is used. These things will take time and effort. Finally, there is the issue of fitting customers with real-time meters, and establishing communication networks to collect and process the information.

None of this is impossibly difficult. But it would be a major mistake to trivialize the steps involved.

Q. DO THE PROPOSED RULES ADDRESS THE COMPLEXITIES, COSTS AND OPTIONS FOR METERING AND BILLING IN THE NEW ENVIRONMENT?

A. No. The Proposed Rules make no specific provisions for how metering, load profiling and billing infrastructure are to be developed to begin retail access. This is of particular concern because the Proposed Rules explicitly require that a large number of residential customers be included in the beginning years of the retail access program.

I am concerned that these important logistical issues have not been made more explicit. The requirements to develop metering, load profiling, and billing systems for handling competitive retail transactions are serious, time consuming, and expensive. There will also be differences of opinion as to how to proceed. The Proposed Rules do not recognize these complexities, nor do they provide a mechanism to solve these issues within the period required to meet the implementation goals. The prospect of a "workshop" does not give me confidence that these issues will be resolved in time to make direct access available to a wide cross-section of customers by 1999.

F. Developing a Settlement and Reconciliation Process

Q. WHY IS A SETTLEMENT AND RECONCILIATION PROCESS AN IMPORTANT PART OF ANY RETAIL ACCESS PROGRAM?

A. In a competitive generating market, multiple competing generators are introducing power into the area electric system, while competing suppliers, marketers or aggregators are withdrawing from the system to serve their customers based on variable market prices. For such a system to function properly and efficiently, a workable scheme must be developed to schedule generators, accurately track the transactions, and settle among the buyers and sellers in reasonable time. Otherwise, potentially large number of transactions may become disputed and large sums of money may remain unpaid or uncollected.

The complexity of handling a large number of transactions involving millions of dollars accurately and expeditiously is substantial. And unless such a scheme is fully developed and tested, the consequences may prove to be expensive and highly disruptive.

Q. DO THE PROPOSED RULES CONTAIN ANY PROVISIONS CONCERNING THE DEVELOPMENT OF A SETTLEMENT AND RECONCILIATION SYSTEM?

A. No.

G. Developing a Way to Supply and Price Ancillary Services

Q. WHAT PROBLEMS NEED TO BE ADDRESSED CONCERNING THE PRICING AND METERING OF ANCILLARY SERVICES?

A. Ancillary services include, among others, the supply of reactive power, voltage and frequency control. Under retail access there would be limited opportunity to unbundle some of these services or to buy them competitively from an independent supplier. On the other hand, these services are generally provided by generators — not transmission or distribution wires. A traditional transmission or distribution rate might not include these items and would thereby under-price local utility-provided ancillary services. The mechanism for assuring that these services are supplied and paid for and that the allocation of the costs is reasonable is a substantial task.

Q. HOW WOULD ANCILLARY SERVICES BE PRICED IN A RETAIL ACCESS REGIME?

A. Several issues remain to be resolved in pricing ancillary services. For example, can any of them be metered? Can they be provided competitively, or must they be provided by the transmission owner or operator who, in turn, purchases them from generators? Are there market power issues in any of the ancillary service markets? If so, how can these be resolved? If service is not competitively provided, how would it be regulated?

It is important that the local utilities not be left with the responsibility of maintaining ancillary services without adequate means of compensation. If they are, there may be opportunities for some market participants to take advantage of the situation by purchasing equipment, for instance, that requires the provision of large amounts of reactive power. Forcing some participants to provide uncompensated services would put them at a competitive disadvantage and result in incorrect price signals.

H. Developing a System of Rules for Reciprocity

Q. DOES ARIZONA NEED TO CONSIDER THE EFFECTS OF ANY DIRECT ACCESS DECISION ON OTHER REGIONAL MARKETS?

A. Yes. There are strong transmission ties between some Arizona utilities and their neighbors on all sides. Any program that will create market opportunities in Arizona, or which will change the relative costs of the Arizona utilities, will affect their relative competitive situation.

Q. WHAT ARE SOME OF THE REGIONAL ISSUES THAT MAY IMPOSE COSTS ON ARIZONA IF THERE WERE AN IMMEDIATE TRANSITION TO RETAIL ACCESS?

A. Regional issues that will affect competitive outcomes include:

- Will other states allow reciprocal retail access?

- Will out-of-state suppliers be required to support state social programs?
- Can multi-state utilities bid all their generating capacity in Arizona or only that which is located in Arizona?
- Will state fuel use or environmental requirements be enforced on out-of-state suppliers?
- What responsibilities will out-of-state utilities have for transmission fixed costs, ancillary services and reliability?
- Will out of state suppliers be liable for Arizona taxes?

Each of these issues may impose costs on Arizona utilities, ratepayers, or taxpayers, if regional issues are not settled before retail access is imposed.

Q. DR. LANDON, YOU HAVE TESTIFIED AT SOME LENGTH ON SOME OF THE SPECIFIC THINGS THAT THE COMMISSION SHOULD CONSIDER AND ADDRESS BEFORE RETAIL ACCESS IS IMPLEMENTED. CAN YOU COMMENT ON WHAT WOULD HAPPEN IF THESE ISSUES ARE NOT PROMPTLY AND PROPERLY RESOLVED?

A. A number of unpleasant things are likely to occur if the Commission fails to correctly resolve important issues before proceeding, ranging from fairly minor annoyances to fairly major disasters. Some of these will have significant negative consequences for electric customers and utilities in Arizona, as well as the state as a whole.

Q. CAN YOU PLEASE ELABORATE?

A. Let me begin by listing just a few of the more obvious items that could *potentially* go wrong if retail access is hastily attempted without adequate planning and resolution of the logistical issues.

- Without a fully functioning system to coordinate the operation and dispatch of the required power sources, there is no guarantee that transmission systems and generation plants will be optimally used, and there may be concerns with market power or self-dealing. Consequently average system-wide costs may not be as low as they can be.

- Without a fully functioning system to coordinate the operation and dispatch of the required power sources, there may be no effective way to maintain system reliability and to reward generators for providing capacity when needed. Power quality and system reliability may suffer.

- Without a fully functioning system to coordinate the operation and dispatch of the required power sources, there will be no effective way to balance supply and demand and set a market clearing price in real time. In a competitive market, price has to be allowed to vary to clear the market. No regulatory substitute will work.

- Without a fully functioning system to communicate the variable system price to large numbers of customers and to receive their responses to varying prices, there may be no effective way to balance supply and demand during emergencies or periods of capacity shortages. The entire system could become unstable.

- Without a fully functioning communication network and significant number of real-time meters, there is no way to encourage customers to respond to high or low prices in real-time. System economics and stability will suffer.

- Without a significant number of customers fitted with real-time meters, or placed on reasonably accurate load profiles, there will be no way to accurately bill customers for what they have consumed given variable prices. Massive disputes and confusion are likely to ensue.

- Without a fully upgraded and functioning customer information system (CIS) there will be no way to produce accurate and timely bills for hundreds of thousands of customers. Billing errors or delays will be highly interruptive and expensive to resolve.

- Without a fully developed and tested settlement protocols, major disputes are likely to arise in determining who has bought what from whom and at what price. Significant sums of money may be disputed and major delays in settling disputes may follow.

- Without clearly defined rules and protocols, provision of ancillary services may become problematic or may not be available. Customer frustrations and complaints are to be expected.

- Without fair and equitable reciprocity rules and service obligations which are fully defined and established, Arizona utilities may be disadvantaged vis-à-vis their out-of-state competitors and utilities receiving government subsidies.

This is not intended as an all inclusive list, but merely a list of some of the more obvious things that could possibly go wrong and create havoc.

Q. HOW SERIOUS ARE THESE ISSUES?

A. Most of these issues are likely to be technically complex and contentious and may have no quick or easy solutions. Moreover, other problems not listed here, or combinations of these problems could occur, jeopardizing system economics, reliability and stability. It is not prudent to proceed on retail access in Arizona without serious attention and study of the technical and logistical aspects of implementation.

Q. HOW ARE THESE ISSUES RESOLVED IN THE PRESENT SYSTEM?

A. Some of the issues I have identified are not relevant to the current regime. For example, we currently do not have to worry about a real-time market clearing price, or settlement protocols, or large numbers of real-time meters. These items become important only when you introduce additional complexities such as variable prices and competing generators and suppliers to the market are introduced.

Secondly, under current regulations and established protocols, some of these issues such as system reliability and ancillary services are provided by a single provider within an exclusive franchise area with an obligation to serve. Provision and pricing of these services becomes an issue only with the introduction of competing suppliers within a previously exclusive service area.

VIII. THE ROLE OF THE REGULATOR DURING AND AFTER THE TRANSITION IS UNCLEAR

Q. ARE THERE OTHER CONCERNS THAT YOU HAVE ABOUT THE PROPOSED RULES?

A. Yes. Although the Proposed Rules are unclear on a number of technical issues that I raised above, it is equally ambiguous about the role that the Commission will play in both the transition to competition and the future competitive market.

Q. DO THE PROPOSED RULES PROPOSE A REALISTIC BALANCE OF COMPETITION AND REGULATION DURING THE TRANSITION PERIOD?

A. No. Generally speaking, competition makes it very difficult to exercise continued regulatory control. The availability of regulated and market alternatives will cause customers and suppliers to self-select options that lower their own costs. Regulated rates and cross-subsidies cannot easily be sustained when customers can leave if they are charged more than the market value of serving their load. An existing average price cannot be maintained if large numbers of below-average-cost customers are induced to leave.

Furthermore, the greater the regulatory control, the less chance there is that the remaining competition will produce its hoped-for benefits. This introduces an inherent tension. The regulator cannot easily force outcomes that would not occur in a competitive market without distorting competition.

Q. CAN YOU GIVE AN EXAMPLE OF THIS?

A. Yes. Currently, electric utilities are obligated to serve all customers requesting service in their certificated areas at tariffed rates. This obligation results in service to some customers at prices below the cost of serving them. It provides all customers with the security that electricity will be available at predictable prices on a non-discriminatory basis.

Q. CAN THE CURRENT OBLIGATION TO SERVE BE MAINTAINED IN A REGIME OF RETAIL ACCESS?

A. No. The obligation to serve, as it is currently applied, is inconsistent with retail access.

Q. HOW IS OBLIGATION TO SERVE INCONSISTENT WITH RETAIL ACCESS?

A. Under the current regulatory compact, utilities have an obligation to serve all customers located in their service area at tariffed rates and, in return, are promised recovery of their prudent investments and reasonable costs, plus the opportunity to earn a regulated rate of return.

If one part of this interdependent agreement is changed — namely by giving the customers the opportunity to buy service from competing suppliers — the other part must be changed as well. Allowing retail customers to take their business elsewhere, while maintaining the obligation to serve at average cost based tariffed rates, would create burdens for the incumbent utility and give improper price signals to the switching customer. The burden on the incumbent utility arises from two sources: 1) the cost associated with uncertainty in capacity planning since customers can switch back and forth from one supplier to another at will; and 2) the incentives that would bring former customers back at times when the costs of serving them will exceed the revenue they would produce via embedded-cost rates.

Q. WOULD IT BE REASONABLE TO MANDATE THAT AN INCUMBENT UTILITY, SUCH AS APS, CONTINUE TO OFFER BUNDLED SERVICE AT RATES THAT ARE CAPPED AT OR CLOSE TO TODAY'S COST-OF-SERVICE WHEN CUSTOMERS WILL HAVE UNREGULATED OPTIONS?

A. No. It would be unreasonable to expect APS to be able to provide market access and also offer ratepayers a bundled service at rates that are capped at present average cost levels. The reason has to do with differences in cost of service among customers. The customers who are most likely to take advantage of the opportunities for market access are those whose cost to serve is low. These customers will be attractive to competitors and will stand to gain the most. Therefore, it is plausible to expect a substantially disproportionate exit by low-cost-to-serve customers.

The customers who remain, therefore, will be disproportionately high-cost to serve customers. These customers cannot profitably be served without substantial rate increases.

There are other problems associated with mandating an obligation to serve while also providing market options. First, an obligation to serve may require utilities to maintain or acquire capacity and make other commitments to serve uncertain loads while at the same time, their customers have the option to purchase in the competitive market place. The ability of customers to switch back and forth may cause new potentially stranded costs which the utility would have no way to recover in the market. Moreover, it could cause uneconomic cost shifting and inefficiency and raise the utilities' cost of capital.

Second, the apportionment of responsibility to serve returning customers (as well as small, remote, or low-income customers) and the manner in which the cost of meeting these obligations is financed, will determine whether a level competitive playing field is established after the restructuring. This will, in turn, determine whether restructuring results in appropriate price signals for retail customers. If not, inefficiency will result.

Third, there will be regulatory costs if service obligations require dual regulatory and competitive regimes.

Q. IS THIS WHAT YOU MEAN BY THE TENSION BETWEEN THE ROLE OF THE REGULATOR AND THE IMPLEMENTATION OF COMPETITIVE MARKETS?

A. Yes, this is an example of that tension. The root cause of this problem is that average cost tariffs make it possible to transfer some of the high costs of serving some customers to customers who are less costly to serve. These policies were sustainable under a monopoly regime when customers paying more than their own costs had no alternatives. Competition inevitably exposes these transfers. If the ACC wants to pursue competition, it must be willing to recognize that it cannot use price caps and other regulatory mechanisms to fix the outcomes that competitive markets will produce. Rates for some customers will, and should, rise if this increase is a reflection of the greater costs they impose on society. Only when competition has produced substantial net benefits is it plausible that all parties can be better off. This is highly unlikely during the transition period.

Q. COULD THE OBLIGATION TO SERVE BE MAINTAINED FOR PARTICULAR CLASSES OF CUSTOMERS, SUCH AS LOW-INCOME RESIDENTS, IN A REGIME OF DIRECT ACCESS?

A. It would be possible, but difficult. Services offered to selected customers at below-market prices would require a mechanism to finance them without providing an unfair cost advantage to competitors. Using general tax revenues would be the least distorting option. An obligatory charge on wires access is another funding alternative.

Q. WHAT DO YOU RECOMMEND BE DONE WITH THE OBLIGATION TO SERVE?

A. The best solution is the elimination of the obligation to serve simultaneous with the introduction of retail access. A best efforts obligation of the distributor to purchase on the market and resell to customers at cost plus an adder could be imposed if any non-market option is required. If that is not enough, any obligation to serve must be carefully structured and its costs evenly allocated. Getting this right is important and would not be simple or inexpensive.

Q. ARE THERE OTHER AREAS IN WHICH THE ROLE OF THE REGULATOR IS UNRESOLVED?

A. Yes. The shift from regulation to competition involves the elimination of centralized control over capacity expansion, i.e., integrated resource planning (IRP). In the regulated framework, the obligation to serve brought with it a requirement that sufficient capacity be available to meet that obligation. The integrated utility had information about, and control over, its system and strong incentives to manage it to provide highly reliable service.

Q. CAN COMPETITION MAKE THE ADDITION OF CAPACITY MORE DIFFICULT?

A. Yes. In competitive markets, consumer demand determines the aggregate level of capacity, which results from the decentralized decisions of both buyers and sellers. Market prices convey information about the need, or lack thereof, for capacity. When the price is high, signaling insufficient capacity, suppliers have an incentive to invest. Moreover, some units with high operating costs will be maintained such that they can be started when prices reach a sufficient level to make operating these units profitable. At the same time, price rationing of demand helps cushion short-term shortages. Having the opportunity to curtail more load voluntarily, i.e. on a price rationing basis, during system disturbances might actually make it easier to manage such events. In any case, the use of price to balance supply and demand need not lead to a degradation of service for other customers. For this process to work properly, however, there must be times when price rations excess demand.

Q. HOW DOES THIS PRICE SIGNALING CONTRAST WITH WHAT OCCURS IN REGULATED MARKETS?

A. In regulated electricity markets, regulators and utilities engage in IRP to determine what capacity should be added to meet the needs of the service area. The only role for price in rationing of demand is in the form of interruptible tariffs. These arrangements essentially pay price responsive customers in advance for the option of curtailing them when the supply/demand balance narrows sufficiently. These tariffs typically limit the number of such interruptions.

Q. COULD THE REGULATOR IN THE COMPETITIVE MARKET MANDATE CERTAIN STANDARDS SUCH AS RESERVE MARGINS TO ACHIEVE IMPORTANT GOALS SUCH AS SYSTEM RELIABILITY?

A. Yes, but if a system is required to meet a mandated reserve margin it would reduce the value of competition. Herein lies the tension. Mandating reserves would depress market prices, retard entry of new generation, and potentially increase the amount of stranded cost.

Q. HOW IS THIS RELATED TO THE PROPOSED RULES?

A. As stated previously, the Proposed Rules do not spell out even the broad outline of the mechanisms that will be used to ensure service quality and reliability. Nor does it recognize that it will introduce market inefficiencies if it attempts to apply its old rules and standards. This is a complex and important issue, and the regulator needs to determine what role it will play in addressing long-run capacity considerations in a competitive environment. A high level of regulatory oversight could limit the value of competition, and the lack of an adequate mechanism to insure that new capacity is constructed could result in system reliability problems. The complexity and importance of these issues will present a challenge to their satisfactory resolution in time to meet the deadlines in the Proposed Rules.

IX. THE SCOPE AND TIMING OF THE PROPOSED RULES ARE AMBITIOUS

Q. GIVEN THE LOGISTICAL ISSUES THAT NEED TO BE ADDRESSED AND THE AMBIGUITY OF THE ROLE OF THE REGULATOR, DO YOU BELIEVE THE CURRENT SCOPE AND TIMING OF THE PROPOSED RULES ARE REASONABLE?

A. No. Much work will have to be done in a short period of time in order to address the technical, equity and efficiency issues and still meet the proposed timeline. To ensure that retail access has a chance to succeed, the implementation and transition stage must be marked by careful design, planning, development, testing, and implementation. Because the Proposed Rules would begin retail access in 1999 on a relatively large scale, the consequences of failing to address important technical considerations are quite large. If these logistics are not adequately and quickly resolved, retail competition cannot be fully supported, will not be fully functional, and will not produce net benefits. The potential costs associated with poor planning and hasty implementation could be significant both in terms of the difficulties encountered in introducing a competitive market as well as the problems and disputes that are likely to be encountered among suppliers and customers.

Q. DR. LANDON, DO THE PROPOSED RULES ADDRESS THE DETAILS AND MECHANICS OF HOW RETAIL ACCESS WILL BE ACHIEVED WITHIN THE COMMISSION'S TIMELINE?

A. No. The Proposed Rules delegate to workshops nearly every critical issue that is important to the actual development of a retail access program, including: how participants will be selected for the first phases of retail access; the magnitude of stranded cost recovery and the mechanisms needed to realize recovery; metering requirements, test year designation, adjustment mechanisms, de-averaging of rates, service characteristics, revenue uncertainty, performance bonds, line extension policies, and system benefit charges; system reliability and safety issues; and legal issues. The Proposed Rules makes no provision for resolving transmission governance, market organization or system operations.

Q. DO YOU BELIEVE THAT THE COMMISSION'S USE OF WORKSHOPS TO RESOLVE THESE ISSUES IS APPROPRIATE?

A. No. Although I have no fundamental objections to deferring some of the detailed and technical items to be debated and resolved in workshops attended by industry stakeholders, I do, however, have major objections to assuming that some of the most critical and substantive issues will be satisfactorily resolved in a timely manner through workshops. The Commission is being overly optimistic about the ability of stakeholders with divergent interests to come to mutually agreeable and consistent terms on critical operational and technical issues.

Q. CAN YOU ELABORATE?

A. Yes. There are a handful of highly critical, substantive issues which must be addressed, discussed, debated, and resolved before retail access can be successfully implemented. Some of these issues are technically challenging while others involve difficult tradeoffs or daunting legal and equity issues. Most are highly contested, some are politically charged, others are technically untested. Significant sums of money are at stake, and there are potential winners and losers. It is not reasonable, logical, or prudent to delegate the resolution of these critical issues to a workshop. The Commission needs to provide a mechanism to develop a proper evidentiary record and reach an appropriate resolution of these issues. It is important to remember that even if, contrary to my expectations, workshops were able to reach a consensus on key issues, these resolutions would be unlikely to result in a coherent structure. Imagine the building that would result from compromising among separate teams of architects for each aspect of the building.

Q. HAVE OTHER STATES CONSIDERING RETAIL ACCESS PROVIDED MORE GUIDANCE ON THESE CRITICAL ISSUES?

A. Yes. I believe a comparison of the Proposed Rules' treatment of, for example, stranded cost recovery with other state's retail access directives is illustrative. The Arizona Proposed Rules devote approximately a page and a half to the issue. In contrast, the California Public Utilities Commission (CPUC) issued its final decision directing retail access, D. 95-12-063, in December, 1995 and addressed the issue of transition costs and stranded cost recovery in a chapter devoted to stranded cost issues. Specifically, the CPUC directed: the establishment of a competition transition charge (CTC), rules for accelerating cost recovery on utility generating plants, the market valuation mechanisms used to measure stranded costs, and calculations for transition costs.

Early in November, Pennsylvania released final draft legislation that proposes electric competition in the state beginning in 1999. The draft legislation addresses the issue of stranded costs in □ 3209 that calls for a CTC mechanism, provides a recovery period of nine years, sets principles for cost recovery by affected utilities, lists mitigation efforts affected utilities will be expected to undertake, and sets up basic provisions for the use of transition bonds to recovery a portion of stranded costs.

Q. SHOULD THE ARIZONA COMMISSION PROVIDE THIS LEVEL OF DETAIL IN ITS PROPOSED RULES?

A. Yes. If the Commission expects workshops to address a number of outstanding issues, then it must provide more general guidance so that the workshop process can develop information on the remaining details. Once major policy decisions have been made, it would be appropriate to use workshops to provide alternatives for the mechanics or the logistics of aspects of implementation. A system to resolve differences of opinion and to ensure consistency and adequacy of the overall system is also required. Given the lack of specificity in the Proposed Rules now, and the lack of a forum to resolve disputes, it is not realistic to expect that the workshop participants will be able to proceed efficiently.

Q. WHAT OTHER ISSUES DOES THE COMMISSION NEED TO CONSIDER WITH RESPECT TO THE SCOPE AND TIMING PROPOSED IN THE PROPOSED RULES?

A. Based on the experience of California, the timing envisioned by the Proposed Rules may be overly ambitious. California's retail access program, scheduled to begin in 1998, will start on a much smaller scale than is envisioned in Arizona. In contrast to the Proposed Rules' proposal to begin its first phase in 1999 by allowing 20 percent of 1995 statewide retail load to participate in retail access, California will initially allow approximately 4 percent of statewide load, or about 1800 MW into the retail access program. Despite the modest size of the initial program, an enormous amount of effort has gone into establishing the mechanisms needed to achieve retail access by the CPUC's deadline.

Q. ARE THESE COMPARISONS RELEVANT?

A. Yes. California is currently struggling to codify and implement the technical provisions of its retail access proposal. To do so, it has formed seven working groups. The level of effort devoted to each is significant. For example, the Western Power Exchange (WEPEX) working group began to address the design of the ISO and Power Exchange (PX) soon after the California Public Utilities Commission issued its final decision in December 1995. The WEPEX working group is composed of six teams, each dedicated to a specific component of the design and implementation of the ISO and PX system. There are approximately 199 individuals participating in the group. To date, the teams have produced nearly 80 documents totaling over 800 pages. For most teams, meetings are held weekly. In the first two weeks of November alone, for example, WEPEX teams and sub-teams scheduled over 19 day-long day workshops.

The level of effort taking place in the sub-teams is also illustrative. For example, the ancillary services sub-team, one of 15 sub-teams in the WEPEX working group, has been charged with the responsibility of crafting a methodology for the unbundled provision and pricing of ancillary operations — services which have traditionally been supplied by the utilities as part of bundled service. The sub-team began its work last February by developing three presentations that outlined the issues to be addressed. Three people worked full-time for a month to draft the presentations, according to sub-team representatives. The agreements reached based on these presentations were incorporated into the FERC/CPUC Phase I filings. These filings addressed, on a preliminary basis, some of the recommendations for ISO and PX operations. Follow-up efforts included producing a report that outlined the recommendations for developing an ancillary market structure. The report took one of the team members a month and a half to develop.

Within the sub-team, the report did not have consensus amongst all 17 members. In response, members of the ancillary services sub-team have developed approximately five alternative proposals. Throughout the last three months, the team has scheduled at least bi-weekly, day-long meetings to adopt a redrafted ancillary services policy that is a compromise of the disparate views in the sub-team. These efforts are reportedly occupying all sub-team members on a quarter- to half-time basis. Resolution on all ancillary service issues must be reached by mid-January in time to be incorporated into the phase II filings due before the CPUC and FERC by March 5. These filings will provide the specific details for how the ISO and PX will be operated. Of course, this snapshot of the ancillary service sub-team is only an illustration of the broader level efforts taking place in all the working groups.

Q. IS THERE A REASON WHY ARIZONA MUST FOLLOW CALIFORNIA AND ADOPT RETAIL ACCESS AS SOON AS POSSIBLE?

A. The proximity of California to Arizona has, I believe, created erroneous concerns that because California is proposing retail access in 1998, Arizona must follow with its own program on a similar time-frame in order for its citizens to capture the benefits of competition before California does.

Q. IS THIS A REASONABLE CONCERN?

A. No. Wholesale markets are already competitive and power is already flowing from low-cost to high-cost areas. The advent of retail competition is not likely to cause a significant near-term change in the regional dispatch of generation or transmission flows. The relative level of regional market prices over the next several years is very unlikely to change as a consequence of which states first provide retail access. It is more likely to reflect changes in transmission tariffs, transmission governance and transmission access conditions, all of which will evolve at the bulk power level and be heavily influenced by FERC rules and policies.

Q. BUT SHOULDN'T WE BE CONCERNED THAT THE POWER MARKETERS IN CALIFORNIA WILL CONTRACT FOR ALL THE LOWEST-COST RESOURCES?

A. No. This concern is not reasonable for three reasons.

First, many of the same firms will market in both California and Arizona. The resources they acquire are not likely to be dedicated to a specific market.

Second, resources that are low-cost will be purchased at market prices, not at their cost. This is fundamental to the shift to competition. A generator that produces energy at a cost of two cents per kWh and one that produces at four cents a kWh will both sell at six cents, if that is the price that equilibrates supply and demand. Rational generators will not commit their output at less than what they expect it to be worth on the market. Retail access is unlikely to change regional market prices, except to the extent that competition includes greater efficiency in plant operation. Such pressures are now felt in wholesale markets. To the extent that improvements are made, market prices will go down for all buyers, whether wholesale or retail.

Thirdly, the benefits from retail access are likely to flow to the states that develop and implement the most efficient and effective markets, not those who hurry and make decisions which, after the fact, will be found to be ill-considered.

Q. APART FROM THE NEED TO ADEQUATELY ADDRESS COMPLICATED LOGISTICS AND TECHNICAL MATTERS BEFORE THE START OF COMPETITION, DO YOU HAVE OTHER CONCERNS ABOUT THE PROPOSED TIMING OF THE ARIZONA RETAIL ACCESS PROGRAM?

A. Yes. As I have indicated, I believe that the speed with which retail access is proposed to be introduced in Arizona is very ambitious, particularly given the technical issues that the Commission has yet to address. This belief is based on the fact that significant new requirements will be introduced exposing both the customers and the affected utilities to risks and uncertainties for which they may be ill-prepared. For this reason, I recommend a modified schedule which exposes a smaller portion of the customers to retail access in the beginning and a long enough period for the initial phase so that lessons can be learned and systems and structures can be redesigned as required to solve problems encountered.

Q. WHY IS IT IMPORTANT TO ALLOW TIME FOR LEARNING?

A. Presumably, implementing retail access in phases is done to allow suppliers and regulators the opportunity to incorporate lessons learned in the upcoming phase. Each of the Proposed Rules' three phases of retail access is two years long. This close scheduling of the phase-in does not permit the time or opportunity to incorporate any lessons learned in the design and implementation from one phase to the next. The opportunity for learning will be lost if the results of the first phase cannot be known in time to design the subsequent phase. In addition, one or two-year phases gives little information about what the long-run behavior of consumers will be in competition.

Q. WHAT WOULD YOU SUGGEST AS A MORE REASONABLE SCHEDULE FOR INTRODUCING RETAIL ACCESS IN ARIZONA?

A. I suggest the following:

First, the size and schedule for introducing retail access should be decided in consultation with the affected utilities as well as customers, the state legislature, and other stakeholders in Arizona. The affected utilities, in particular, have a great deal at stake in this process and should be consulted. The schedule should be developed in such a way that there is adequate time to digest the results of each phase before the advent of the next.

Second, the introduction of retail access must be closely coordinated with the development and implementation of a working transmission and market mechanism which will allow various generators and suppliers to transact with one another in an open and transparent fashion and for market clearing prices to be established. It is not reasonable to set the schedule for retail access without first addressing when such a system is established and running, and what that system is going to look like.

Third, it is probably desirable to reduce the scale of the first phase from 20 percent to something more like five percent and provide three or more years to allow learning and changes in the structure, as indicated. The second phase may be extended to a larger segment of the customers. And the third phase will extend retail access to all.

Q. WHAT WOULD BE THE BENEFITS OF A MODIFIED SCHEDULE?

A. There would be three specific benefits from such a modified schedule:

First, a smaller portion of customers will initially be exposed to retail access which means that should unexpected technical or logistical glitches be encountered, it will affect a small number of customers and it will be easier for the affected utilities to handle the problem. Experience in the U.K., for example, suggests that technical glitches should be expected.

Second, the utilities will be able test and modify new systems and solutions on a more manageable group of customers before they are confronted with large populations of customers. Once again, the experience in the U.K. suggests that a carefully staged expansion of retail access is a prudent way to proceed.

Third, a phased approach will permit more time and opportunities to learn from the early mistakes and incorporate appropriate solutions into the remaining segments of the market.

Q. IS THERE EMPIRICAL EVIDENCE THAT A MODIFIED SCHEDULED WOULD BE BENEFICIAL?

A. Yes, I believe the experience of the U.K. provides a useful example. Despite the fact that customer choice was introduced in a much slower fashion than Arizona — stretched over eight years versus Arizona's four years — significant technical and logistical glitches were encountered, with serious ramifications. Major problems were avoided only because the number of affected customers was limited in the first two stages.

Q. WHAT WAS THE SCHEDULE FOR INTRODUCING RETAIL CHOICE IN THE U.K.?

A. The market was opened to competition in three staged steps, by customer size. The first-tier customers, those with loads exceeding one MW, were given the option to change suppliers in April 1990. The second-tier customers, with loads in excess of 100 kW, were given the option in April 1994, four years later. All remaining customers will be given the option to choose in April 1998, another four years after the second stage.

Q. HOW MANY CUSTOMERS WERE IN EACH TIER?

A. There were approximately 5,000 customers in stage one; nearly all of whom already had hourly load meters and sophisticated communication equipment. Few major problems were encountered in introducing competition in this stage. There were some 50,000 customers in the second stage — roughly one half of the market in volume terms. Significant problems in metering and settlements were encountered during this stage. The final stage, will affect the remaining 22 million customers, most of whom are medium-to-small-size.

Q. WHAT WAS THE NATURE OF THE PROBLEMS ENCOUNTERED IN 1994?

A. There were problems in inaccurate meter reading, difficulties in data validation, the configuration of different metering systems used were not consistent and created problems, and there were settlement problems.

Q. DID THIS STAGED APPROACH OFFER OPPORTUNITIES TO LEARN FROM THE EARLY MISTAKES?

A. Yes, it did. However, some industry insiders in the U.K. would say that even this staged approach was rushed, not allowing sufficient time in between the succeeding stages, particularly between 1994 and 1998. There are conflicting opinions as to whether retail access will be available to all customers by the April 1998 deadline.

X. THE ACC RULE PROPERLY RECOGNIZES THE NEED FOR FULL RECOVERY OF STRANDED COSTS

A. Stranded Costs in the Context of the Commission's Proposed Rules

Q. YOU HAVE INDICATED THAT THERE ARE SEVERAL TECHNICAL ISSUES THAT THE PROPOSED RULES DO NOT FULLY ADDRESS. DO THE PROPOSED RULES CONSIDER THE ISSUE OF STRANDED COSTS?

A. Yes, they do. I read the rule to establish the general principle that prudently incurred stranded costs are fully recoverable.

Q. DO THE PROPOSED RULES ESTABLISH A SPECIFIC MECHANISM FOR THE RECOVERY OF STRANDED COSTS?

A. No. The Proposed Rules do not propose any specific mechanisms for stranded cost recovery; they direct affected utilities to file a request with the Commission for "approval of distribution charges or other means of recovering unmitigated Stranded Cost." The ACC then proposes to hold hearings that will determine the magnitude of each utility's stranded costs and set appropriate recovery mechanisms.

Q. HOW DOES STRANDED COST ARISE?

A. The transformation of the electric industry from regulated monopolies to competitive markets can only be achieved by dramatically altering the rules that have historically governed utility operations. APS and its predecessor companies have provided retail electric service in Arizona for roughly a century. The ACC has recognized APS's exclusive right to serve in specified portions of the state in a series of proceedings and orders. Now, with its Proposed Rules, the Commission contemplates proceedings to move toward a competitive electric market in which customers are able to choose their suppliers of energy services. Terminating the traditional exclusive relationship between APS and its customers, without a mechanism for the recovery of stranded cost, could result in the stranding of costs associated with the investments that APS has made on behalf of those customers.

Q. WHAT ARE THE SOURCES AND CATEGORIES OF STRANDED OR STRANDABLE COSTS?

A. Potentially stranded costs arise from past investments, contractual commitments and deferred recoveries of expenses, previously reviewed and approved (and, in some cases, mandated) by regulators, that have not yet been recovered by the utility companies and that will not be recovered in a fully competitive market. More specifically, most stranded costs are associated with: 1) past investments in utility-owned generation whose total costs exceed the prices that either do prevail in markets that are already competitive or would prevail in that event; 2) power purchase contracts (with non-utility generators), which the utilities were forced to undertake, based on forecasts of costs and prices that have turned out to be too high; and 3) regulatory assets — including deferred taxes, nuclear decommissioning and other deferred costs — which could similarly not be recovered in competition with generators not similarly burdened.

B. The Existence of a Regulatory Compact Necessitates Stranded Cost Recovery

Q. WHY DO YOU AGREE WITH THE PROPOSED RULES THAT UTILITIES SHOULD BE COMPENSATED FOR THE STRANDED COST PRODUCED BY GOVERNMENT-DIRECTED COMPETITION?

A. The essential basis of the recovery rests on the regulatory compact under which regulated, privately owned and financed public utilities undertook the obligation to serve specific areas, in exchange for the opportunity to recover prudently incurred costs and a regulated return on investment.

Q. CAN YOU EXPAND ON THIS COMPACT?

A. Yes. The obligation to serve brings with it the duty to conscientiously anticipate the future needs of consumers and to undertake the investments required to meet those needs. In general, regulated industries have four major obligations imposed on them because of their special status.

1. They are obligated to serve all who apply for service. A regulated company must be prepared to serve any customer who is willing and able to pay for the service. This requirement may mean that it must provide capital investment in areas where it is not profitable to do so, or maintain service to customers who are not profitable to serve. Nonregulated businesses, however, may legally decline to serve areas or potential customers that are not profitable.

2. They are obligated to make investments to provide safe and reliable service. Thus, for example, they must build capacity in advance of growth in demand and provide operating and dispatch systems to ensure reliable service.

3. They have an obligation to serve similar customers on equal terms. Unjust or undue discrimination between customers is not permitted.

4. They are obligated to charge no more than a "just and reasonable" price. Nonregulated businesses are under no such restraint.

In addition, regulators have required utilities to fund energy conservation programs, to assess and collect certain state taxes, to subsidize low-income customers, to incorporate environmental protection in their investment and supply decisions, and to purchase power from independent power producers at regulatorily (and, in some cases, statutorily) stipulated rates, with the understanding that they would be permitted to recover these costs in their rates, or through other means.

Q. DO YOU HAVE ANY CONCERNS REGARDING THE STRANDED COST RECOVERY DISCUSSION IN THE PROPOSED RULES?

A. Yes. I am concerned with the language on mitigation and with the factors that the stranded costs working group is directed to consider. Regarding mitigation, the Proposed Rules refer repeatedly to an intention to grant stranded cost recovery only to those costs that cannot be mitigated. This is a reasonable position. However, 1) The standard for mitigation is not clearly defined; 2) As a point of principle, recovery of prudently incurred costs should not be conditioned on future markets or unrelated actions in other areas. Utilities have met their obligations and now need to be made whole so that they have the same opportunities to compete in a new competitive market that regulators are mandating; and 3) As a point of practicality, there are limited opportunities for utilities to pay down their stranded costs. I believe that the standard should be whether the utility has made a reasonable effort to mitigate. The standard should not be an ex-post assessment of whether utilities' efforts were successful. Moreover, I am troubled by the implication that the state's utilities must both position themselves to compete in their traditional markets and develop other undefined new markets to fund their past obligations.

Q. WHAT IS YOUR UNDERSTANDING OF THE PROPOSED RULES' APPROACH IN DETERMINING THE MAGNITUDE OF STRANDED COSTS?

A. The Proposed Rules state that:

> The Commission shall, after hearing and consideration of analyses and recommendations presented by the affected utilities, staff, and intervenors, determine for each Affected Utility *the magnitude of Stranded Costs*, and appropriate Stranded Cost recovery mechanisms and charges. In making its determination of mechanisms and charges, the Commission shall consider *at least* the following *factors*: (emphasis added)

and the Proposed Rules list 11 factors, which it has proposed to use in determining the magnitude of stranded costs. The same factors are also to be considered by a working group to make recommendations on stranded cost issues.

Q. WHAT ARE YOUR VIEWS ON THE PROPOSED RULES' PROPOSED APPROACH?

A. There are two separate and important issues to consider here. First, one has to determine the *magnitude* of stranded costs so that it is fair and accurate.

Second, one has to set the *mechanisms*, the charges, and the period over which these costs are to be recovered — i.e., the rules for full, and equitable stranded cost recovery.

It is vitally important to get the first item right — namely the magnitude of the stranded costs to be recovered — and then concentrate on the mechanics and the timing of cost recovery. Unless one gets the first item right, the second cannot produce an equitable result.

Q. IN YOUR OPINION, HAVE THE PROPOSED RULES APPROPRIATELY ADDRESSED THE FIRST ITEM?

A. There is ambiguity on this point in the Proposed Rules. The clear statement that stranded cost shall be recovered may be construed by some as "muddied" by the 11 factors thereafter listed in the Proposed Rules.

Q. WHAT ARE YOUR VIEWS ON THE RELEVANCE AND APPROPRIATENESS OF THE SUGGESTED FACTORS IN DETERMINING THE MAGNITUDE AND MECHANICS OF STRANDED COST RECOVERY?

A. There are 11 factors that the Commission wants parties to consider. There are:

1. The impact of Stranded Cost recovery on the effectiveness of competition;
2. The impact of Stranded Cost recovery on customers of the Affected Utility who do not participate in the competitive market;
3. The impact, if any, on the Affected Utility's ability to meet debt obligations;
4. The impact of Stranded Cost recovery on prices paid by consumers who participate in the competitive market.
5. The degree to which the Affected Utility has mitigated or offset Stranded Cost;
6. The degree to which some assets have values in excess of their book values;
7. Appropriate treatment of negative Stranded Cost;

8. The time period over which such Stranded Cost charges may be recovered. The Commission shall limit the application of such charges to a specific time period;

9. The ease of determining the amount of Stranded Cost;

10. The applicability of Stranded Cost to interruptible customers;

11. The amount of electricity generated by renewable generating resources owned by the Affected Utility.

The Proposed Rules' 11 factors mix the magnitude issue with the mechanics and timing of cost recovery. It would be preferable to keep these issues separate. While a few of the factors listed should be considered in determining the magnitude of stranded costs, many are inappropriate, irrelevant, or worse. As it stands, only factors #5, #6 and #7 have anything to do with determining the magnitude of stranded costs issue. All the others are either irrelevant or focused on either the mechanics or timing of stranded cost recovery.

Q. WHICH OF THE FACTORS LISTED ARE RELEVANT TO THE MECHANICS AND TIMING OF COST RECOVERY?

A. Factors #1, #2, #3, #4, #8, #9 and #10 are arguably relevant to the mechanics of cost recovery but should have nothing to do with determining the magnitude of the stranded costs that must be recovered.

Q. WHAT ABOUT FACTOR #11?

A. The amount of renewable energy owned by a utility should have no bearing on its rights to fully recover its stranded costs, period. The two issues are not related and should not be confused. This factor, along with the Proposed Rules' solar generation portfolio requirement, are an incongruent appendix to the issue of retail access and customer choice in Arizona. They simply do not fit here. Furthermore, such requirements are likely to increase the utility's stranded costs to the extent that they may require investment in above-market renewable energy.

Q. WHAT WOULD BE A PREFERABLE WAY TO PROCEED?

A. The determination of the magnitude of stranded costs should be kept separate from its recovery mechanism.

The costs that become stranded — and potentially unrecoverable — as a result of the Commission's desire to introduce retail access in Arizona should be identified and quantified accurately, regardless of their magnitude. And the affected utilities should be given firm assurance that these costs will be fully recovered through a specified mechanism. There should be no "ifs" or "buts" on these issues.

Once that hurdle is passed, it is important to agree on the cost recovery mechanism and the duration over which the costs are to be collected.

Q. DO THE PROPOSED RULES OFFER A SPECIFIC MECHANISM FOR RECOVERING STRANDED COSTS?

A. No. As I discussed earlier, the Proposed Rules state that utilities "...shall request Commission approval of distribution charges or other means of recovering unmitigated stranded costs."

Q. IS IT IMPORTANT THAT THE MECHANISM USED FOR STRANDED COST RECOVER BE WELL DESIGNED?

A. Yes. If the utility companies' potentially stranded costs are to be recovered without distorting efficient competition, all customers, regardless of their source of supply, must pay a share. A customer that continues to take bundled service from the vertically integrated utility will pay its share so long as the company's rates continue to include those costs. For customers who seek access to alternative suppliers, utilities need to recover those costs through a non-bypassable portion of their rates. This can be accomplished through a direct charge to customers and/or a charge that competitive suppliers pay as part of the price for access to the utility transmission and distribution system. Whatever the specific mechanism, it is important that it be designed to encourage efficient competition, which means that suppliers must compete and succeed or fail on the basis of their relative incremental costs.

Q. IS A WELL-DESIGNED MEANS OF STRANDED COST RECOVERY CONSISTENT WITH ECONOMIC EFFICIENCY?

A. Yes. Efficiency requires that bargains be kept, that transfers of cost responsibility be minimized, and that prices reflect the relative resource costs of alternatives.

Q. WHY DOES EFFICIENCY REQUIRE THAT BARGAINS BE KEPT?

A. Unless the supplier, the purchaser and the regulator can rely on each other to keep their bargain, the risk will keep some otherwise efficient bargains from being made. The expected value of the cost of default will be added to the return required to justify investments. The effect will be fewer and more costly transactions among independent parties and greater incentives for vertical or horizontal integration.

Q. WHAT DO TRANSFERS OF COST RESPONSIBILITY HAVE TO DO WITH EFFICIENCY?

A. Transfers of cost responsibility, which allow some customers to benefit at the expense of others, tend to move prices for both the benefited and the burdened entities away from costs. This distorts consumption and investment.

Q. WHAT RELATION IS THERE BETWEEN STRANDED COST RECOVERY, CORRECT PRICE SIGNALS AND EFFICIENCY?

A. Clearly setting forth customers' stranded cost obligations allows customers to choose among market alternatives based on their relative costs. Customers will select the supplier which can serve them with the least burden on society's resources only if the prices customers face in the market reflect the relative marginal costs of the alternatives.

Q. IF REGULATORS NOW ACTIVELY PROMOTE COMPETITIVE RETAIL MARKETS IN WHICH PRICES ARE DETERMINED BY SUPPLY AND DEMAND, ARE CUSTOMER CHOICES LIKELY TO BE EFFICIENT?

A. Only if the rules of the market are clear. If present suppliers cannot compete to retain that load without giving up their right to claim payment for stranded cost, or if purchasers do not know what their liability for stranded cost will be if they change suppliers, the market cannot work efficiently. For example, if the present supplier believes it is entitled to full recovery of all capacity charges and a potential supplier with excess capacity believes it would have no long-run obligation to serve the customer, their respective offers may contrast a price reflecting the short-term marginal costs of the alternative supplier (largely incremental fuel and variable O&M) with the full average embedded costs (including fixed costs of existing generation) of the present supplier. Such a comparison is not likely to result in efficient choices on a consistent basis.

Q. HOW DOES A CHARGE FOR STRANDED COST HELP TO GET THE PRICE SIGNAL RIGHT?

A. A stranded cost charge improves the efficiency of choices by setting the obligation to pay for stranded cost aside from supplier choice. If customers are to be given the appropriate price signals, both the old and the new supplier must be free to bid on the basis of their respective marginal costs. When there is an obligation to pay for stranded cost, the separation of these costs for recovery, regardless of the future supplier, will allow all potential providers to bid for future business based on their respective marginal costs. Use of market prices, coupled with recovery of stranded cost, would allow competition to enhance welfare while not burdening other customers.

Q. IF A STRANDED COST CHARGE MAKES IT UNATTRACTIVE FOR CUSTOMERS TO SWITCH SUPPLIERS, IS THIS ANTI-COMPETITIVE?

A. No. Although fixing a charge to customers decreases the value of switching suppliers, it does not preclude such switches. Once stranded cost recovery has been determined, the existing supplier will be able to compete actively in the market on an equal footing with the other suppliers. Also, to the extent that the remaining market alternatives convey correct price signals, it enhances efficiency and is not anti-competitive even if other suppliers are less attractive as a result. Moreover, it is likely that stranded cost will not be a continuing problem as competitors adjust to permanent changes in market structure and alternatives.

XI. THE PROPOSED SOLAR PORTFOLIO IS NOT SUPPORTED BY ECONOMIC ANALYSIS AND MAY NOT ACHIEVE ITS INTENDED OBJECTIVES

Q. WHAT ARE YOUR VIEWS ON THE RULE'S PROPOSED SOLAR PORTFOLIO?

A. I have several serious reservations concerning the solar portfolio as proposed:

First, an arbitrarily-defined and regulatory-mandated solar portfolio is fundamentally at odds with the Proposed Rules' otherwise stated objectives to introduce competition, reduce costs, and provide customer choice in Arizona.

Second, it makes no economic sense for Arizona ratepayers to single-handedly and unilaterally subsidize the development of non-price competitive solar energy; and

Third, there is no reason to believe or expect that the Proposed Rules' solar mandate — even if it were carried out to the letter — will have any appreciable long-term impact on the development of solar thermal energy technologies on a world-wide scale.

Q. PLEASE ELABORATE ON EACH OF THESE ITEMS.

A. First, the Proposed Rules provide no justification for the one-half percent and one percent figures. Such detailed directives should be based on a strong evidentiary record. A regulatory mandated solar portfolio, if carried out as proposed, will have the effect of increasing prices at the same time when the Commission is introducing incentives for utilities to reduce costs and become competitive. It will also create yet another class of strandable assets which cannot survive in the market without regulatory support.

Second, the Proposed Rules' solar portfolio— if carried out as proposed — will mean that Arizona ratepayers will essentially subsidize further development of currently uneconomic solar-thermal energy technologies. If successful, these subsidies would benefit a world-wide market. The rationale for Arizona ratepayers shouldering the burden of these costs is not clear.

Third, the energy business today is a world-wide business. Cost-effective and environmentally superior technologies developed in one country are rapidly applied elsewhere as information and financing flows freely across countries and continents. It is, therefore, highly unlikely that requiring one-half percent or one percent of Arizona's load to be supplied from solar thermal technologies will make a major contribution to technology development. Arizona's retail electronic sales are very small compared to the annual growth in electric demand in the world. For these reasons, I am led to believe that the Proposed Rules' solar portfolio requirement should be carefully considered in evidentiary proceedings and not adopted as part of these Proposed Rules.

Q. DO YOU CONSIDER THE SOLAR PROVISIONS IN THE PROPOSED RULES TO BE A FORM OF SUBSIDY?

A. Yes. A subsidy distorts the market process by providing support greater than that the market would supply. Currently, it is more costly to purchase power from solar power plants than from other generation sources. By mandating that a certain amount of power be procured from solar generation, the ACC is requiring that ratepayers pay more for some of their power. The difference between what the consumers would have paid for power without the mandate and the price at which solar power is purchased is the value of the subsidy.

Q. DR. LANDON, CAN YOU PLEASE COMMENT ON THE MECHANISM THAT THE ACC HAS CHOSEN TO IMPLEMENT A SOLAR SUBSIDY?

A. By mandating that a certain percentage of total retail energy sales in Arizona be generated from solar resources, the ACC is essentially implementing a quota system.

Quotas often cause significant market distortions. The size of the distortion of this program will depend on how expensive the required programs turn out to be as compared with market alternatives.

Q. WHAT ARE YOUR RECOMMENDATIONS WITH RESPECT TO THE SOLAR PORTFOLIO?

A. If the Commission wishes to further encourage or subsidize the development of non-cost competitive solar or renewable generation in Arizona, I suggest that the topic be approached as a separate issue in a separate proceeding, and provide economic justification for their proposals.

Q. ARE YOU SUGGESTING THAT IT IS INAPPROPRIATE FOR ARIZONA TO PROVIDE SUBSIDIES TO SOLAR POWER?

A. Not necessarily. What I am opposed to is the unilateral decision to provide subsidies that bypass legislature and the need for evidentiary hearings to evaluate the potential cost and benefits. I am also against using stranded cost recovery as a lever to promote the solar agenda.

Q. CAN YOU SUMMARIZE THE CONCLUSIONS YOU HAVE REACHED FROM YOUR REVIEW OF THE PROPOSED RULES AND THE EIS?

A. Yes. The Proposed Rules set forth objectives but do not provide a framework for achieving them. The EIS is grossly inadequate to support either the net benefits of achieving the goals, or the proposed timing of the transition. A much clearer vision of how a competitive market would be organized and how the transition should be achieved and a properly done economic analysis of the costs should proceed adoption of any rule.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

HIERONYMUS

BEFORE THE

ARIZONA CORPORATION COMMISSION

DOCKET NO. R-0000-94-165

TESTIMONY

OF

DR. WILLIAM H. HIERONYMUS

ON BEHALF OF

ARIZONA PUBLIC SERVICE COMPANY

NOVEMBER 27, 1996

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I. QUALIFICATIONS AND PURPOSE

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is William H. Hieronymus. My business address is Putnam, Hayes & Bartlett, Inc., One Memorial Drive, Cambridge, Massachusetts 02142.

Q. BY WHOM ARE YOU EMPLOYED?

A. I am a Director of Putnam, Hayes & Bartlett, Inc. (PHB) an economic and management consulting firm with offices in Cambridge, Washington D.C., Los Angeles and Palo Alto.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE?

A. I received my bachelor's degree from the University of Iowa in 1965, my master's degree in economics in 1967 and a doctoral degree in economics in 1969 from the University of Michigan, where I was a Woodrow Wilson Fellow and National Science Foundation Fellow. After serving in the U.S. Army, I began my consulting career. In 1973 I joined Charles River Associates as a specialist in antitrust economics. By the mid-1970s my principal focus was on the economics of energy and network industries. In 1978 I joined PHB. At PHB, my consulting practice has focused almost exclusively on network industries, particularly electric utilities.

During the past 23 years, I have completed numerous assignments for electric utilities; state and federal government agencies and regulatory bodies; energy and equipment companies; research organizations and trade associations; independent power producers and investors; international aid and lending agencies; and foreign governments. While I have worked on most economics-related aspects of the utility sector, a major theme has been public polices and their relation to the strategies and operation of utility companies.

Since about 1988, the main focus of my consulting has been on electric utility industry restructuring and related regulatory innovations and utility privatization. In that year, I began work on the restructuring and privatization of the electric utility industry of the United Kingdom, an assignment on which I worked nearly full time through the completion of the restructuring in 1990. I also led a major study of the reorganization of the New Zealand electricity sector, focusing mainly on competition issues in the generating sector. Following privatization of the U.K. industry, I continued to work in the United Kingdom for electricity clients based there and also was involved in restructuring studies concerning the former Soviet Union, eastern Europe, the European Union and specific European countries. Late in 1993 I returned to the United States, where I have worked on electric industry restructuring, regulatory reform and the increasingly competitive future of the U.S. electricity industry.

I have testified before state and federal regulatory bodies, legislative bodies and federal courts on numerous occasions, principally on electric utility maters but also on antitrust and civil litigation. My resume is attached as Attachment A of this exhibit.

Q. WHAT ROLE HAS PHB PLAYED IN ELECTRIC INDUSTRY RESTRUCTURING EFFORTS IN OTHER JURISDICTIONS?

A. PHB has been in the forefront of efforts to restructure the electric industry, beginning with the United Kingdom in 1988. PHB has provided guidance to governments and utilities in restructuring efforts in New Zealand; the states of Victoria and New South Wales in Australia; South America; Spain; Hungary; Ukraine; and currently in the European Union. In this country, we have been the principal consultants for utilities in New York and those in the Pennsylvania-New Jersey-Maryland Pool (PJM), NEPOOL, Wisconsin, California, and other states. PHB is the source of much of the current conceptual framework for industry restructuring. PHB also has extensive experience in the restructuring and deregulation of other industries, including natural gas.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to respond, at the request of the Arizona Public Service Company (hereafter, APS), to the Commission's Order of October 9, 1996, in which the Commission published proposed rules intended to initiate retail competition in the electricity sector not later than January 1, 1999. In my response, I will examine the feasibility of implementing the rules' proposed phase-in of retail competition beginning in 1999 and explain why the proposed rules and the workshop process are not sufficient to lay the foundation for the introduction of retail competition. I will then discuss various foundation issues that must be resolved by the Commission to implement a competitive market. My testimony will also discuss the lessons learned from restructuring efforts elsewhere and describe the elements that other jurisdiction have found to be essential to support retail competition.

II. SUMMARY OF CONCLUSIONS

Q. PLEASE SUMMARIZE THE CONCLUSIONS YOU REACH IN YOUR TESTIMONY.

A. The proposed rules should not be adopted in their current form. The "record" on which the order is based is grossly inadequate to support a final rule on a matter so important as the total restructuring of the regulation of electricity supply in Arizona. As a matter of public policy, the filtration of that "record" through the exceedingly summary staff synopses of the workshops excessively delegates the Commission's decision making authority, and the three day oral hearing schedule proposed does not remedy this defect. The Economic Impact Statement appended to the draft rule is cursory, conclusory and grossly deficient.

The lack of foundation for the rule is reflected in its inadequacies. A rule of this type must set out clearly how critical issues have been or will be resolved and define an achievable and specific process for implementation. The rule does neither. At a substantive level, the proposed rule fails to address important, complex issues that are unavoidably raised by the introduction of retail competition and whose resolution is essential prior to implementing a competitive market. These issues have arisen in every jurisdiction in which retail competition has been attempted and their resolution is necessary to lay a solid foundation to support retail competition. Indeed, until the main issues have been firmly decided, it is premature to even specify a timetable for the introduction of competition.

Moreover, the proposed rules fail to set forth a process by which the Commission and stakeholders can confront the critical threshold issues associated with retail competition and resolve them in an informed, coordinated and consistent manner. The Staff workshops called for in the proposed rules are unlikely to prove sufficient to implement settled decisions, much less resolve the questions that should have been resolved by this order. Implementation cannot proceed through the type of ad hoc workshops that preceded this order. Rather, it requires dedicated staffing and leadership, with continuous involvement by knowledgeable participants. Only when the main issues have been decided can these task forces -- "workshops" cannot achieve the purpose of implementation -- be coordinated so that the resulting electricity restructuring is internally consistent. There almost certainly is a need for a plenary body, either the Commission itself or a steering group of participants, to make mid-course corrections to the process and (if it is not the Commission) to forward to the Commission key issues that must be resolved.

With all respect to ACC Staff, the draft rule aggrandizes to the Staff more responsibility than it can manage. The procedure Staff embodies in the draft order is one in which it will convene "workshops" on customer selection for phased access; unbundled service; standard offer service and system benefits charges; and stranded costs. In addition, it will provide requested assistance to the Legislature; participate in the Commission's inquiry into spot market development and independent system operation; and participate in the working group on system reliability and safety. The basic operating framework appears to be that the Staff will somehow distill out of these workshops and activities an actionable implementation of the restructuring and report on it to the Commission. Where specified, the reports are due within six to eight months of the establishment of the activities. The precedent of other restructuring proceedings indicates that the scope of the activities of the "workshops," the time required to resolve the matters within their scope and the quantity and quality of staff resources required are naively underestimated. Further, the interpositioning of staff between the expertise and positions of the parties participating in implementation and the Commission effectively denies to the Commission the ability to understand fully the concerns and ideas of parties, effectively making the Staff the policy maker, judge and very nearly sole decision maker.

Q. WHAT DO YOU RECOMMEND THAT THE COMMISSION DO?

A. A change in regulation of the magnitude contemplated by the draft rule is the most important policy issue ever faced by this Commission. In my opinion, the Commission would be badly remiss if it does not hold hearings to consider the main alternatives facing it, to understand what is required to implement these alternatives and to establish a process that will assure successful implementation of its chosen alternative. Due to the importance of the issue, and the fact that it involves difficult issues that the Commission has not previously had reason to face, my recommendation is that the Commissioners themselves attend and participate in the hearings to the maximum feasible extent. As discussed below, the Order arising out of such hearings should resolve uncertainties concerning the key issues that are not resolved in the existing draft rule and should set a structure and schedule for subsequent task force operations, filings and proceedings.

Q. WHAT THRESHOLD ISSUES MUST THE COMMISSION RESOLVE TO LAY THE PROPER FOUNDATION FOR RETAIL COMPETITION?

A. As the following partial list indicates, the introduction of retail competition raises issues that are substantially more important, difficult and complex than implied by the proposed rules or acknowledged by the Economic Impact Statement (EIS) attached to the draft rule. These are issues that affect fundamental public policy relating to how electricity services will be reliably provided and how the market will operate in an efficient and fair manner. Given the importance of electricity to the State's economy and the health and safety of Arizona's citizens, it is essential that these issues be fully and intelligently resolved in order to achieve the benefits of a competitive market for all affected consumers.

- How will reliability be assured? One of the most critical issues arising from retail access is reliability. Ending the Affected Utilities' retail franchise necessarily means that they no longer can be required to plan for and meet their franchise area loads. Other mechanisms must be substituted that will assure both sufficient capacity to meet loads and that the capacity is made available when needed. The draft order deals with this issue only by the establishment of a working group and a requirement that each Electric Service Provider (ESP) comply with Northern America Electric Reliability Council (NERC) and Western System Coordinating Council (WSCC) standards and practices. This is absolutely irresponsible, since it specifies neither a means for ESPs to meet those requirements nor a means of ensuring that ESPs meet them. The lack of attention to this key issue is further demonstrated by a provision of the draft rule that allows ESPs to withdraw from serving their customers on a mere 30 days' notice. Clearly, if load-serving ESPs have only very short run responsibility, a mechanism must be established to provide generators with compensation adequate to make sufficient capacity available, including reserve capacity that is only used infrequently.

- How will the Arizona electricity system be coordinated to assure the minute-to-minute matching of load and generation required for reliability? The draft order is silent on this question, except for the statement that the Commission will study the possibility of an independent system operator (ISO). Those who are seeking to implement the rule must know who will be responsible and how they will meet their responsibilities. If existing control area operators remain responsible, task groups must establish the protocols for the timely notification of loads and generation by other ESPs, for clearing mismatches between the loads and generation of an ESP, for prioritizing instructions that are not simultaneously feasible and so on. If the Commission intends that an ISO assume this responsibility, the Commission must decide this issue quickly, since development of ISO capabilities and the protocols it will use for area control will otherwise become the pacing item. Note also that an ISO requires FERC approval, so the schedule must allow time for FERC consideration and action after task groups finish developing ISO governance and operating procedures.
- Will there be a wholesale spot market and, if so, how will it operate? In California, task groups consumed over a year on this issue. Yet the draft rule simply reserves it as something that the Arizona Commission will study in the future.
- What role does the Commission wish to take in determining the transmission tariff and ancillary services provisions? The draft rule ducks these issues to FERC, where ultimate authority indeed lies. Yet other state commissions have decided that these are far too important to leave solely to FERC.
- How does the Commission propose to assure itself that market power will not subvert the benefits of competition? This has been a major issue in other states' restructurings of their electricity sectors. While the fact that Arizona is

on a major transmission highway and contains substantial generation owned by out-of-state utilities probably means that market power will not be a major issue, the Commission should not wholly ignore this issue as the draft rule does. Some parties are almost certain to raise issues concerning the market power of transmission-owning utilities even if generation is fully competitive.

- What guidance does the Commission wish to give concerning unbundling of functions and services of vertically integrated utilities? The draft order would simply order them to establish unbundled tariffs, without guidance. There are hard issues concerning boundaries and the allocation of costs that the utilities almost certainly will do differently and with differing effects on what elements are subject to competition (and potential cost stranding). One particular difficulty is establishing boundaries between retailing and distribution functions.
- What policies guide tariff setting? Tariff unbundling and the movement of generation and retail functions to competition will materially change the cost of serving particular customers. Even with full stranded cost recovery, there will be winners and losers. How does the Commission propose to mitigate effects on losers, if at all? Does the requirement for continuing bundled tariffs side-by-side with unbundled pricing create severe "cherry picking" problems and, if so, what does the Commission propose to do about the inequity and revenue erosion inherent in cherry-picking?
- Is the Commission aware of, and prepared to accept, the loss of jurisdiction implied by the draft rule?
- How will the Commission enforce in-state reciprocity, given that utilities not subject to its jurisdiction can sell into jurisdictional areas through power merchants?
- What mechanisms will be needed to settle the transactions of ESPs? The draft rule is completely silent on how and by whom the metered loads of the hundreds of thousands of customers that the rule proposes be made competitively accessible in only two years will be matched on an hour-by-hour basis to their ESP and how the aggregate loads of the ESP will be matched to

the generation that it has under contract. This is a truly mammoth undertaking, likely involving extensive software development as well as supporting load research and/or meter installation. It is absolutely critical that the Commission plan and execute this development properly to make retail access successful.

- How will the Commission determine the level of and allow recovery of stranded costs? The draft order states unambiguously that the Commission will allow recovery of unmitigated stranded costs. However, it also lists 11 criteria governing how it will allow such costs to be recovered, some of which clearly go to the calculation of the costs themselves and others of which have no apparent relevance. Staff proposes a workshop to give guidance on stranded cost analysis and recovery, yet also proposes that the Commission will itself decide these issues, but only after the filing of stranded cost proposals by utilities (for which no date is given). The Commission should be aware that utilities cannot possibly file stranded cost assessments until key issues concerning unbundling and market mechanisms are decided, since the former affects the costs allocated to competitive activities and the latter affects market revenues.
- What is the basis for the tariff filings of ESPs? Clearly, ESP tariffs (other than the bundled tariffs and unbundled tariffs of monopoly activities of Affected Utilities) ought not be cost-based, since the whole point of the draft rule is to move to a competitive market with market prices. The filing of price terms in ESP tariffs would seem to be wholly inconsistent with the intent of the rule.
- Under unbundling, how will the Commission deal with issues of confidentiality of consumer information, the need for standards for meters and meter installation, the logistical problems associated with installing sufficient meters to meet the phase-in targets, and other measures needed to implement retail competition?
- What new institutions, measures, or other consumer protection rules need to be put in place to deal with currently unregulated entities, such as merchant plants, non-utility retailers and marketers?

- How will the Commission ensure that the Arizona achieves the goals of public policy programs while not placing utilities in an unfair competitive advantage if they continue to bear program costs?

The proposed rules fail both to recognize the scope and difficulty of these issues or to provide an adequate process for addressing and resolving them. Because the proposed rules fail to lay the necessary foundation to support a decision to implement retail competition, the Commission is not yet in a position to implement the proposed rules through a workshop process set forth in the proposed rules. Instead, the appropriate foundation can only be established after the Commission has held comprehensive hearings that allow the Commission to understand and resolve the critical issues in a reasoned manner.

Q. IF THE COMMISSION ADOPTS YOUR SUGGESTION FOR HEARINGS TO PROVIDE A FRAMEWORK FOR IMPLEMENTING RETAIL ACCESS, WILL THIS DELAY THE INTRODUCTION OF RETAIL COMPETITION?

A. No. In my opinion, the process proposed in the draft rule is doomed to failure and frustration. The Commission will not achieve successful implementation until it establishes a workable process. The experience in other jurisdictions demonstrates two important propositions. The first is that mistakes made in the hasty and ill-conceived introduction of competition, and the ad hoc regulatory and other mechanisms to support it, are difficult to remedy later, since market participants quickly gain a stake in the new structure and rules and are in a much better position to block changes then they are before competition begins. The second is that stakeholders cannot make progress on implementation until the Commission (and perhaps the Legislature) establish the new system's basic architecture, which the draft rules do not do. For example, California was unable to move forward on implementing retail direct access until it resolved the argument over wholesale market mechanisms.

Q. ASSUMING, HYPOTHETICALLY, THAT GETTING THE RULES FOR A COMPETITIVE MARKET IN ARIZONA RIGHT WOULD SOMEWHAT DELAY THE INTRODUCTION OF

COMPETITION, WOULD THIS LEAD TO A SIGNIFICANT LOSS IN BENEFITS TO ARIZONA CONSUMERS?

A. No. It is important to understand what the benefits of competition are and from where they arise. Lower prices -- the presumed principal benefit of competition -- arise primarily from expected improvement in the efficiency of the bulk power market. That is, lower prices arise primarily from the effects of competition at the wholesale level, as well as the incentives of performance-based regulatory mechanisms on remaining monopoly functions. Retail access does not directly impact these elements, although the wholesale market competition that is part of the proposed system clearly affects incentives to reduce costs at the bulk power level. The costs associated with purely retail functions are typically only about five percent or less of the total electricity bill, and almost certainly will increase due to the loss of scale economies, the need for a settlements system and the vastly increased provider and customer expense associated with the marketing by multiple service providers. My point is simply that retail competition in and of itself will not reduce costs. This is why some state commissions have focused so much of their attention on competition in bulk power markets and on incentive regulation for monopoly activities.

On the other hand, retail competition, if done correctly, can lead to innovation and new services more closely matched to the needs of individual consumers. Hence, while retail competition per se may not reduce electricity prices much beyond what is possible from an efficient wholesale market, product and services innovation can make electricity more valuable to consumers.

Another reason why there will be little loss for consumers if access is somewhat delayed is that the main utilities in Arizona already have very substantial incentives to reduce costs due to the performance based ratemaking (PBR) provisions under which they are operating. APS is amortizing its regulatory costs under PBR. Once competition is introduced, the unamortized costs will be converted to a stranded cost charge.

Third, the draft rule properly provides that Affected Utilities will be allowed to recover any stranded costs created by retail competition This means that for the period of stranded cost recovery, these costs still will be paid by all customers, including those that avail themselves of competing ESPs. Further, generation still will come principally from the same generating stations as at present. The sum of market-based energy prices and stranded cost payments during this transition period will not be much different from what customers pay today for the same level of consumption.

Q. DOES APS SUPPORT THE INTRODUCTION OF RETAIL COMPETITION?

A. I understand that APS is prepared to support retail competition provided the Commission takes the time to develop appropriate mechanisms and rules that are needed to support retail competition and to make the competition efficient and fair.

Q. HAS APS TAKEN ANY STEPS TO PREPARE FOR COMPETITION?

A. Yes. It is my understanding that APS has already taken a number of important steps to prepare for meaningful competition. For example, APS is currently subject to a PBR mechanism that provides strong incentives for APS to lower its operating costs. The Company has also filed an Open Access Tariff to provide open, non-discriminatory access to APS's transmission facilities for wholesale transactions. APS is also establishing procedures, in conjunction with regional transmission groups and other regional entities to ensure that all traders have timely, comparable access to information regarding the availability of transmission on the APS and regional interconnected grid. In addition, APS has been taking steps that will facilitate unbundling of electricity services in ways that facilitate competition. The Company is prepared to take additional actions to foster a fully competitive market in which its customers receive all of the benefits of competition.

Q. ARE THERE IMPORTANT ISSUES THAT THE COMMISSION MUST ADDRESS BEFORE ADOPTING FINAL RULES THAT YOU DO NOT DISCUSS IN YOUR TESTIMONY?

A. Yes. There are threshold issues relating to the Commission's legal authority to order or authorize retail competition under Arizona law. Additional state law questions arise with respect to the potential impact on tax revenues that various state and local entities receive from affected utilities under the current regulatory structure but which may be uncertain in a competitive market structure. My testimony does not address these issues, which APS will deal with in other filings. My testimony focuses on other critical issues associated with the structure of electricity markets and the implications of that structure for utilities and existing regulatory institutions and mechanisms.

Q. WHAT ISSUES ARISE CONCERNING THE OBLIGATION TO SERVE AND THE UTILITIES' RESPONSIBILITIES FOR RELIABILITY?

A. The introduction of retail competition fundamentally changes the existing regulatory compact under which utilities currently operate. Clearly, the introduction of competition must change the utilities' obligation to serve and the associated responsibility to plan for and acquire resources sufficient to meet the demands of Arizona consumers in a reliable manner. The proposed rules properly imply that Affected Utilities will be relieved of the obligation to serve those customers who elect to participate in the retail market.[1] However, the proposed rules do not consider how system reliability will be maintained if this occurs. My testimony describes reliability issues that arise in a transition from a regulatory structure to a competitive structure. Among other things, the Commission will face fundamental policy decisions about whether to rely primarily on market-based mechanisms and prices to balance supply and demand or whether to continue to impose some type of regulatory obligation on utilities and other load-serving entities to acquire the resources necessary to meet reliability standards. If the Commission chooses the latter approach, it will also have to consider the need for regulatory oversight of the means by which the utilities and other load-serving entities acquire such resources. In addition, the Commission must decide how the utilities will recover the costs of the resources acquired to maintain reliability, particularly when market prices are insufficient to cover the costs of those resources that operate infrequently.

Q. WHAT ISSUES WILL THE COMMISSION FACE REGARDING THE NEED TO REFORM WHOLESALE MARKETS?

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1 Proposed Rule R14-2-1604.

A. The introduction of retail competition requires that regulators give careful consideration to the elements that are necessary to support a fully competitive market. In every other jurisdiction in which retail competition has been attempted, regulators and utilities have had to confront the need for substantial changes in the wholesale market, including the creation of spot markets and the assurance that system operators continue to ensure reliable operations, while providing non-discriminatory treatment of all generators and load-serving ESPs, including access to transmission and other essential facilities and services.

Q. WILL SUCH REFORMS OF THE WHOLESALE MARKET BE NECESSARY TO IMPLEMENT RETAIL COMPETITION?

A. In my opinion, the Commission should carefully consider its options concerning the operation of the wholesale market. As I have discussed, most of the savings arising from competition are at the wholesale level. However, it is the reliability and efficiency of bulk power generation and transmission operation that are most at risk from removing the existing form of regulation.

I will suggest that, apart from assuring the continuing reliability of the bulk power system, the most important question facing the Commission concerning how the competitive market will operate concerns the system dispatch function, which includes (at a minimum) the economic function of clearing transactions among bilateral traders. Determining whether these functions will be performed by an ISO or by the utility system operators (or some combination) and whether dispatch and transmission rights will be allocated based on prices or some other basis are threshold questions for the Commission, since the answers will strongly influence how the Commission and Arizona utilities will deal with many associated issues. If the Commission concludes that an open spot market is essential, it will have to resolve issues about how that market functions, who administers the market and who may participate, as well as how the spot market is coordinated with the functions of the system operator. In my testimony, I describe some of the key issues that must be addressed, including the relationship between spot market operations and day-to-day operational reliability, as well as the acquisition and pricing of ancillary services such as the balancing and load-following service necessary to support bilateral contracts and maintain reliable system operations.

Other regulators also have confronted the issue of whether the control area functions will continue to be performed by existing utilities or transferred in whole or in part to an ISO. If the Commission chooses the former, it must consider how the utility system operators provide market participants all of the services necessary to support a competitive market, price those services (or recover their costs) and provide comparable treatment for all competitors. If the Commission chooses the latter, it must examine the options for the ISO's structure and the means for assuring that its governance maintains competent, reliable and non-discriminatory operations. In my testimony, I explain these options in greater detail and discuss the issues that arise and must be resolved with either choice. In either event, the Commission must also consider how transmission prices will be set, both to recover fixed costs and to recovery the costs associated with managing congestion and dealing with reliability constraints.

Q. WHAT ISSUES MUST THE COMMISSION ADDRESS WITH RESPECT TO STRANDED COSTS CREATED BY RETAIL COMPETITION?

A. Once a competitive market begins, the ability of retail consumers to move to energy suppliers other than the existing utility raises concerns about the creation of stranded costs and the mechanisms by which such costs would be determined and recovered from all customers. I discuss the implications of choosing to determine such costs through forecasting methods or through market-based methods. I also briefly discuss collection methods and securitization.

Q. WHAT ISSUES MUST THE COMMISSION RESOLVE WITH RESPECT TO ITS LACK OF JURISDICTION OVER ALL LOAD-SERVING ENTITIES IN ARIZONA?

A. The Commission does not have regulatory authority over all load-serving entities in Arizona, including municipally owned utilities and the Salt River Project. This lack of comprehensive authority means that those entities subject to Commission jurisdiction can

Exhibit No. __ - __

be put in an unfair competitive position if their service areas are opened to retail competition, but there is no reciprocal right to compete in the service areas of non-jurisdictional entities. The consumers served by these other entities would not receive the benefits of a competitive market. The Commission should consider whether some of these issues can be addressed by the State Legislature. Additional issues are raised by the fact that some of these entities enjoy preferential access to power sold by federal marketing agencies, as well as other advantages.

Q. WILL THE COMMISSION NEED TO ADDRESS ISSUES RELATING TO MARKET POWER?

A. To the extent that retail competition involves the ability to apply market-based prices, some analysis of market power is probably necessary. My testimony discusses the need for market power analysis and how market power relates to market rules and the structure of existing utilities.

Q. WHAT ISSUES RELATING TO UNBUNDLING MUST THE COMMISSION RESOLVE?

A. Retail competition implies important changes in rate structures, since consumers will have the ability to contract with service providers other than their current utility. A key issue relates to how utilities must unbundle and price their currently bundled services. The unbundling necessary to support a competitive market implies that prices for many services will be determined through market-based mechanisms, rather than regulatory cost-of-service mechanisms. In addition, the Commission must consider how the specifics of unbundling affects stranded costs and the unbundling of distribution and retailing activities. I also explain why retail access requires that the Commission deal with issues relating to non-discriminatory access to consumer information, confidentiality, the need for standards for meters and meter installation, the licensing of retailers and other measures to protect consumers.

Q. WHAT ADDITIONAL ISSUES ARISE WITH RESPECT TO CONSUMER PROTECTION AND FAIRNESS?

A. Even before the new market begins, there will be efforts by market participants to "cherry-pick" select utility customers. The attempts will require the Commission to address the need for interim measures to ensure that the customers selected are not allowed to bypass their fair share of stranded costs nor shift those costs onto other customers.

Before retail competition is allowed, the Commission will also need to consider whether additional institutions and rules need to be in place to protect consumers from unfair business practices. Among the issues that the Commission will face is whether it or some other entity may need additional authority to license or otherwise regulate currently unregulated entities, such as merchant plants and non-utility retail marketers. In fairness to the draft rules, I note that this is one area where the rule gives considerable guidance to the implementation process.

Q. DOES THE INTRODUCTION OF RETAIL COMPETITION ALSO RAISE CONCERNS ABOUT PUBLIC POLICY PROGRAMS?

A. Yes. Public policy programs, including demand-side management; solar and other renewable efforts; low-income assistance; and other programs can all be adversely affected by a transition to competition. The Commission will need to examine the issues that arise for these programs and address the concern that the programs may become "stranded benefits."

Q. WHAT ARE THE PRINCIPAL LESSONS LEARNED FROM OTHER JURISDICTIONS THAT HAVE ATTEMPTED TO INTRODUCE RETAIL COMPETITION?

A. There are dozens of important lessons that can be learned from those experiences, and my testimony discusses many of them. At the broadest level, almost universally other jurisdictions have underestimated the difficulty and complexity of restructuring, as well as the time it takes to get the rules and market institutions right. Restructuring efforts are still underway in almost every jurisdiction, even in the United Kingdom, which started in 1988 and is still struggling to bring retail competition to the residential sector. The experience in deregulating natural gas is no more encouraging; despite the deregulation of gas wellhead prices in 1978, there is still only limited competition at the retail level, especially for small consumers. On the other hand, substantial price reductions have occurred at the wholesale level for both electricity and natural gas.

Another universal lesson is that electricity is different, and the difference prevents electricity restructuring from following the patterns of gas, telecommunications or other industry deregulation efforts. The difference flows partly from the pervasive degree to which the economy and the comfort and safety of the population depend on the uninterrupted, reliable provision of electric service. This factor affects the degree to which market mechanisms can fully displace the current regulatory structure. Equally important, the nature of electricity is different; it cannot be easily stored and must be consumed and generated simultaneously, requiring a mechanism to coordinate flows and keep loads and resources on the interconnected system balanced at every moment. These characteristics necessitate a degree of central coordination of system operations that is in tension with the normal attributes of fully decentralized markets. Every other jurisdiction has recognized that some degree of coordination is necessary between system operations and market mechanisms to ensure both system reliability and market efficiency. Indeed, defining that degree of coordination turns out to be a principal focus of restructuring efforts in every other jurisdiction.

Q. WILL TAKING THE TIME TO GET THE RULES AND INSTITUTIONS RIGHT PUT ARIZONA AT A DISADVANTAGE, GIVEN THE STATUS OF CALIFORNIA'S RESTRUCTURING PROCESS?

A. That seems very unlikely. To begin with, the California process is nowhere near complete. Although the California Commission and Legislature have set 1998 as the start of the new market structure, there are serious challenges that must be overcome for that to happen. My guess is that California is at least six months to a year behind at this point.

I understand that there is a concern that if California opens its retail markets significantly ahead of Arizona, suppliers to California customers will contract for all of the cheap power available in the WSCC. There is no basis for this concern. Suppliers and customers have so far shown a great reluctance to enter into long-term contracts until the California rules are clearly established, approved by the Federal Energy Regulatory Commission and fully understood by market participants. I see little evidence that power marketers are signing long-run contracts; indeed, I recently had reason to become aware of the portfolio of one of the largest marketers and found that it contained no contracts longer than one year. I also note that nearly all power in the United Kingdom, where the access market is well established, is traded on a spot or annual contract basis. Arizona can thus take the time to get the market institutions and pricing rules right without fear that the cheapest supplies will be all committed to the California market.

Q. WHAT ARE THE LIKELY CONSEQUENCES OF FAILING TO ADDRESS THE THRESHOLD ISSUES?

A. The threshold issues must be accurately defined and resolved in order to get right the rules and institutions needed to support retail competition. Unless these are done right, the effort is unlikely to produce the hoped-for benefits. Retail competition will be inefficient and unfair, and some select traders will benefit at the expense of other traders and consumers. A fair retail market requires that all consumers have an equal opportunity to participate, which requires comparable access to the mechanisms that support the market. Those mechanisms function primarily at the wholesale level, however. Hence, fair and beneficial retail competition strongly depends on efficient pricing rules in and non-discriminatory access to the wholesale market.

Q. DOES THAT CONCLUDE YOUR INITIAL SUMMARY?

A. Yes. My testimony contains a lengthy discussion of many of these issues and raises more detailed questions that are only suggested by this summary. The essential point is that the introduction of retail competition is an extremely serious, complex and difficult undertaking, with implications for virtually every existing institution and regulatory mechanism. The Commission cannot avoid these issues and still expect to achieve its retail competition goals or expect to achieve any of the hoped-for benefits. Resolving these issues professionally and getting the rules right is essential to achieving the benefits of a competitive market. Hence, a comprehensive investigation of these issues is necessary and should be conducted at least initially through hearings -- preferably full-panel hearings -- involving all affected parties. These hearings should begin as soon as possible and should clearly precede the development and consideration of any final rule or implementation workshops.

III. THE PROCESS FOR ESTABLISHING A COMPETITIVE RETAIL MARKET

Q. WHAT MUST THE COMMISSION DO TO ESTABLISH A FOUNDATION FOR RETAIL COMPETITION?

A. To achieve the Commission's goals for a truly competitive market at the retail level, the Commission must lay the proper foundation for competition to ensure that it is open, efficient, and fair to all consumers. This will first require the Commission to examine whether new market-oriented institutions are needed to support a competitive market. If the Commission decides to rely solely on existing institutions, the Commission will still have to consider new rules for how these institutions provide and price the services necessary to support retail competition. Second, the Commission (and, where necessary, the Legislature) must make fundamental changes in long-established regulatory policies and statutes to allow competition to occur at the retail level in a fair and efficient manner.[2] Third, the Commission and the Legislature will need to provide, *up front*, appropriate assurances that utility customers and investors will be treated fairly with regard to recovery of costs incurred under the current regulatory structure, so that any costs stranded by the introduction of retail competition are not shifted onto small consumers or imposed on APS investors by those seeking to bypass such costs. Fourth, the Commission, and perhaps the Legislature, will have to examine and decide critical questions about how electricity consumers can be assured that a competitive electricity market will provide the level of reliable electric service expected by the citizens of Arizona. In conjunction with the State Legislature, the Commission will also have to address the mechanisms under which current public policy programs will be continued and funded, the need for legislative changes that ensure that retail competition is made available to all Arizona consumers and the need for additional measures to ensure that consumers have adequate protections against unfair business practices by competitors.

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[2] My testimony does not address any legal issues that arise if the Commission proceeds with the proposed rule before resolving matters of authority and jurisdiction under State and federal law.

Q. CAN THIS FOUNDATION BE PROVIDED WITHIN THE TIMETABLE SET FORTH IN THE PROPOSED RULES FOR THE PHASE IN OF RETAIL COMPETITION?

A. The schedule set forth in the proposed rule for phasing in retail competition is extremely ambitious and may not be attainable. It will not be met if the draft rules are adopted without modification. In my opinion, the schedule will be accelerated if the Commission recognizes that the proposed rules, while setting a goal for retail competition, do not provide a sufficient foundation for bringing a competitive market into being and that such a foundation must be laid first. Once this foundation is laid, the Commission will need a credible process for implementing the threshold decisions and designing the necessary rules and mechanisms to support an efficient market. If all parties are prepared to commit the resources and effort necessary to complete these tasks, then it may be possible to commence retail competition within two or three years.

Q. WHAT CAN ARIZONA LEARN FROM EXPERIENCES IN OTHER JURISDICTIONS?

A. There are several advanced efforts to develop competitive electricity markets and extend competition to the retail level, both in this country or other countries. These efforts provide a valuable source of information on what steps must be taken and the issues that arise at each step. However, none of these efforts in other jurisdictions is complete, even though some are two to three years ahead of the Arizona effort. These experiences all show that introducing retail competition is substantially more difficult and takes far more time than the Arizona proposed rules acknowledge. In this country, no state has reached even the initial goals the proposed rules set as the targets for 1999, a mere two years from now. New York and California, the two states that are the farthest along toward retail competition, are still at least a year and half (or more) away from attaining the initial goals and are encountering serious difficulties despite working diligently on the effort for the last two to three years and even though their respective regulatory commissions have issued fairly definitive blueprints for the institutions and market mechanisms that must be put in place to implement an efficient, fair market. In these states, moreover, important assurances -- such as fair recovery of stranded costs, protections against shifting costs onto small consumers and measures to ensure continued reliability -- that must be provided to gain the support of affected utilities and their customers have already been addressed to a substantial degree. In California these issues have been addressed by legislation supported by a broad coalition of parties and already enacted and signed into law. The steps already taken in other states suggest that the State of Arizona has a great deal of work to do before it can responsibly and confidently set a deadline for the introduction of retail competition.

Q. HOW FAR ALONG IS THE ARIZONA PROCESS RELATIVE TO CALIFORNIA'S EXPERIENCE?

A. The Staff's proposed rules are roughly equivalent to the California Commission Staff's 1994 issuance of the "*Blue Book*,"[3] which proposed the initiation of retail competition by the ambitious date of January 1, 1996. However, the *Blue Book* did not lead to retail competition; instead the foundation for retail competition did not come until a year and a half later, when, after several full-panel hearings, the issuance of two alternative policy statements and numerous rounds of public comments, the California Commission issued its final Policy Decision.[4] The Policy Decision provided a blueprint for the market structure and principles to guide the development of the rules necessary to support fair competition; that is, it addressed most of the threshold issues that the Arizona proposed rules fail to address. Under the Policy Decision, retail competition will not begin in California until the beginning of 1998 (and most observers believe that target will not be met). Even then, many parties were not fully committed to introducing retail competition until the State Legislature codified key elements of the California Commission's Policy Decision and provided additional mechanisms for recovery of stranded costs, assurances regarding reliability and measures for consumer protection. Hence, the Arizona Commission is still several critical steps away from being able to adopt a final rule or set a deadline for introducing retail competition.

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3 Proposed Policies Governing Restructuring in California's Electric Services Industry and Reforming Regulation, CPUC Div. of Strategic Planning, April 20, 1994.

4 Preferred Policy Decision, D. 95-12-063, December 20, 1996, as modified by D. 96-01-009, January 10, 1996.

Q. IS THE PROCESS SET FORTH IN THE PROPOSED RULES SUFFICIENT TO MEET THE GOALS?

A. No. While the Commission's proposed rules set forth an ambitious schedule to introduce and phase in retail competition, they provide few details on how this is to come about and almost no preview of what lies ahead. The principal mechanism suggested by the rules is a series of staff workshops to begin in the near future or shortly after the rules become final. The rules then contemplate a number of reports to be filed by Commission Staff, with the reports addressing issues for the Commission to resolve prior to the beginning of the competitive market. Experiences in other states, however, suggest that many threshold issues have to be resolved first by the Commission and the Legislature before implementation workshops would be warranted. This means that a far more comprehensive (some would say "exhaustive") effort lies ahead for all concerned before workshops can begin. For example, threshold decisions about whether to improve wholesale markets must precede development of more detailed rules concerning the acquisition and pricing of services necessary to support retail trading. The Commission will also have to make key decisions relating to unbundling; stranded cost calculation and recovery mechanisms; consumer protection rules; and other matters within state jurisdiction. Another large set of filings and decisions will require FERC approval on such matters as comparable transmission access; recovery of fixed transmission costs; and market-based pricing for transmission, energy and ancillary services. A market power analysis will also be necessary to support any proposal to use market-based pricing. The need for an additional process to prepare these filings and consider what they must include is only vaguely recognized in the proposed rules, and there is no recognition of the time and effort necessary to prepare these filings, secure FERC approval and then to implement the FERC decision or to develop the hardware and software necessary to handle settlements for a large number of retail trades.

Q. CAN THE COMMISSION MEET THE GOALS SET FORTH IN THE PROPOSED RULES?

A. Not without major changes and resolution of all threshold issues. The Commission's proposed rules set forth ambitious goals for a retail market, but not much more. The experiences in other states that are attempting to introduce retail competition reveal that meeting such goals in a responsible and intelligent manner requires threshold decisions on several critical issues and the sustained efforts and cooperation of all parties, as well as direct continuing involvement by the Commission and, in my judgment, the eventual support and assistance of the State Legislature. The effort will be difficult and will take at least 2 to 3 years. In my opinion, this effort is worth making, as the potential benefits to the State's economy of an efficient competitive electricity market are probably substantial. However, these benefits are only attainable if the Commission first resolves the threshold issues in a fundamentally sound manner and then provides a process for getting the hundreds of implementation details right.

In the remainder of my testimony, I will set forth and explain the necessary conditions that must be satisfied to allow the Commission to meet its goals for retail competition in a fair and responsible manner.

IV. CONDITIONS FOR A COMPETITIVE WHOLESALE ELECTRICITY MARKET

A. The Importance of Wholesale Issues

Q. WHY IS IT NECESSARY TO FOCUS ON WHOLESALE MARKETS?

A. The institutions and rules needed to foster an open, non-discriminatory wholesale competitive market are also needed to support trading at the retail level. This means that the Commission must consider whether reforms at the wholesale level need to be pursued simultaneously with efforts to open retail markets.

Q. WHAT ISSUES SHOULD THE COMMISSION ADDRESS RELATING TO WHOLESALE MARKETS?

A. Today, the utilities operate the transmission system and coordinate the dispatch of generation to balance loads and resources, thereby ensuring a secure and reliable system. They also coordinate access to the State's interconnected transmission network for wholesale trades. These system operation functions are essential to support a competitive electricity market. As it considers the introduction of retail competition, the Commission must determine at the outset how all market participants can get comparable access to these services at efficient, market-based prices. In that connection the Commission will have to determine whether the functions can best be performed by the existing utilities, as they are today, or by new institutions, such as an independent system operator.

Q. HOW DO THESE TWO APPROACHES DIFFER

A. In the ISO approach, the utilities turn over operational control of their transmission systems and dispatch operations to a new entity with no financial stake in the market. The ISO assumes the responsibility for providing non-discriminatory access to the transmission system for all users and coordinates the dispatch to ensure reliability and support the competitive market. The approach also frees the utility to compete effectively in the market without fear of being accused by competitors of unfairly operating the transmission or dispatch systems.

In the alternative approach, these functions continue to be performed by the utility. FERC policy requires that the utility isolate system operations and dispatch personnel and build a functional "wall" between them and the utility marketing staff by adopting rules and safeguards to ensure that the former provide all services on a comparable basis and the latter do not have special access to information on grid conditions and system operations. FERC open access rules assume that, in the absence of ISOs, existing utilities will pursue this approach, which is sometimes called "functional unbundling." The approach also requires that the utilities create real-time information systems that give all market participants comparable access to information on transmission availability, prices and constraint conditions.

Q. DO THE TWO APPROACHES SHARE COMMON ELEMENTS?

A. Yes. To describe the elements of functional unbundling is to describe part of what must be done to create the rules for an ISO.

Q. IN CONSIDERING THE WHOLESALE UNDERPINNINGS OF RETAIL MARKETS, MUST THE COMMISSION CONSIDER ALTERNATIVE "MARKET MODELS," AS OTHER STATES HAVE DONE?

A. Yes. A debate about wholesale versus retail competition, "poolco" versus "bilateral" models and centrally coordinated trading versus decentralized trading has occurred in every other state that has initiated electricity restructuring proceedings. However, I believe that the Commission will quickly conclude that both bilateral trading and some form of spot market will be required. This is the clear lesson from other jurisdictions both here and abroad. Ironically, this mixed system was not considered by the Staff in its four options.[5]

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[5] See, e.g., Economic Impact Statement, pp. 7-9.

An effective competitive market needs both long-term trades (i.e., bilateral contracts) and a coordinated spot market for short-term transactions, as well as the ability to move freely between the two markets to ensure flexible choices for market participants and efficient results. And because of the interconnected grid, the physics of electrical flows, the presence of loop flows and the potential for congestion, there is an unavoidable need for some central entity -- i.e., a "system operator" -- to coordinate use of the transmission grid and facilitate the short-run transactions associated with keeping the grid balanced, managing congestion and honoring all system reliability constraints.

The proposed rules appear not to recognize the key role played by the system operator in supporting both reliable operations and a competitive market, either at the wholesale or retail level. To make the market fair to all competitors and consumers, these essential functions must be performed in an impartial manner that inspires confidence by all market participants. That implies either an ISO or its utility equivalent through effective "functional unbundling" to ensure non-discriminatory access, facilitate a spot market and support market trades while ensuring reliable and balanced operation of the grid, enhanced efficiency and reliability though regional economic dispatch.

Q. DOES THIS CONCLUSION CONFLICT WITH THE ASSESSMENT IN THE ECONOMIC IMPACT STATEMENT ISSUED IN CONJUNCTION WITH THE PROPOSED RULES?

A. The Economic Impact Statement that accompanies the Commission's proposed rules seriously underestimates the magnitude of the task ahead and mischaracterizes the choices before the Commission. It briefly describes four restructuring options[6] considered over the past two years. The Statement then concludes that the fourth option, "introducing retail competition and allowing bilateral contracts for power supplies," is preferred because it:

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6 Of the four options, only the first, "maintaining the status quo," is significantly different. The other three, while somewhat inaccurately distinguished in the Statement, eventually require the same kinds of rules and institutions to be effective. Moreover, there is nothing mutually exclusive about so-called "poolco" approaches and "bilateral" approaches, nor any reason why a "poolco" need be "exclusive." As other jurisdictions have correctly concluded, a non-exclusive or voluntary pool and bilateral contracts are simply complementary pieces of a more complete market structure; they can and should exist side by side, providing traders a choice between centrally coordinated spot trades and decentralized longer-term bilateral trades.

> . . . minimizes administrative complexity; requires minimal information and planning needs a priori; is relatively flexible so that policy could be adjusted in mid-course; uses existing institutions; minimizes utility organizational disruption; allows buyers and sellers to enter the market freely; limits market power of incumbent utilities; and minimizes public confusion."[7]

While these are perhaps worthwhile attributes, the Commission will discover that almost none of them is true. Once the Commission considers the steps that must be followed to "allow buyers and sellers to enter the market freely," it will find, as other states and countries have found, that a great deal more effort and information will be required to make the system work in a fair and efficient manner, that additional wholesale reforms may be necessary, that the choice does not avoid the need to examine market power and that the complexities involved will be difficult to explain to the public and public officials.

Q. HOW ARE OTHER STATES ENSURING THAT RETAIL COMPETITION IS DONE FAIRLY?

A. In looking for guidance from other states, we tend to see two patterns emerging. In the more cautious approach, several states, including Illinois, Michigan and New Hampshire, have initiated relatively small "experiments" to determine the feasibility of retail competition and to examine the implications for utility system operations, stranded costs, remaining customers and other factors. While regulators usually announce these experiments with some fanfare, some of these experiments involve only a handful of customers and fail to reach the size that reveals the real difficulties in restructuring. Such experiments allow participants to select themselves while accepting ad hoc pricing rules, if not outright subsidies to encourage participation. The rules then limit trading so that it does not encounter transmission constraints or limit the scheduling abilities of the current system, that is, the very difficulties that may require more complex solutions. Thus, these states

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[7] Economic Impact Statement, p. 8.

find that it is possible to accommodate a small number of retail transactions with a series of ad hoc approaches tacked on to the existing structures. Since the experiment is small, the cumulative effects of these ad hoc approaches -- including inefficiencies, subsidies and cost shifts -- are also likely to be small. System operators can, if forced to do so, work around any problems and roll unrecovered costs for a few transactions into regulated rates, spreading them across all ratepayers. All of these unrealistic conditions allow regulators to conclude, wrongly I believe, that they can expand retail competition without substantially changing the way utilities and regulators have always done business and without significantly harming non-participating customers.

Q. WHAT ABOUT STATES WITH MORE EXPANSIVE EFFORTS?

A. States that want to offer the hoped-for benefits of competition to all customers within a short period of time through retail competition and customer choice -- essentially the path Arizona now proposes -- are bypassing experiments and moving directly toward phasing in full retail and wholesale competition. In each case, regulators and utilities alike have decided to pursue a more comprehensive approach involving substantial changes to existing regulatory mechanisms and the creation of new market institutions.

Q. CAN ARIZONA IMPLEMENT RETAIL COMPETITION WITHOUT CONSIDERING THE ORGANIZATION OF WHOLESALE MARKETS?

A. No. The Commission will have to resolve this question as a threshold matter, deciding whether the system control and market coordination functions of the system operator are best performed by the existing utility or by an ISO. Although there are common elements in both approaches, there are also different issues that must be resolved depending on the approach chosen. If the Commission decides to favor an ISO approach, it must resolve issues relating to ISO structure, governance and responsibilities. Alternatively if the Commission decides to rely on utility system operators to perform essential market coordination functions, it will be important to stakeholders for the Commission to ensure that the rules and protocols used by the system operators treat all competitors in a comparable manner. In either event, mechanisms for providing and pricing the services of a spot market will probably be necessary. In my opinion, the Commission will still have to fashion many of the same mechanisms to ensure comparable access to the grid and dispatch services, as well as develop the market-based pricing that system operators will need to price the unbundled services they provide. Many of the rules will have to be submitted to FERC for its approval in any event, since they involve wholesale functions.

B. The Link Between Wholesale Operations and Retail Competition

Q. WHY IS THERE SO MUCH EMPHASIS ON THE SYSTEM OPERATOR'S FUNCTIONS?

A. Typically, initial considerations of restructuring to foster wholesale or retail competition focus on what happens to the generation and transmission functions, with some further attention given to distribution. However, this three-part discussion is woefully incomplete and usually misses the point, since there is a critical fourth function -- system dispatch, coordination and operation -- that utilities currently perform. Implementing any type of competitive electricity market raises a great many questions that directly involve what the control area system operator does, how it does it and how it pays or charges for the services it coordinates. As the discussion below notes, even a limited experiment with retail competition for a few customers directly involves the system operator in scheduling the trades, accommodating them in the context of the host utility's efforts to serve remaining customers and charging or paying for services it provides to traders to implement and/or back up their trades. Hence, even at the simplest level, electricity trading raises all the issues (and more) listed in the following discussion and directly implicates the functions of the system operator.

Q. IS THERE A SIMPLE SHORTCUT TO INTRODUCING RETAIL COMPETITION?

A. In my opinion there is not. The Commission should carefully scrutinize claims that the current framework can easily accommodate retail competition simply by allowing customers to have access to competing suppliers. These claims invariably involve market rules that are inefficient and function primarily to benefit traders and selected customers while shifting the costs associated with their trades onto other consumers.

It is probably possible to give a few large customers the ability to choose from among competing suppliers and allow those suppliers to access the transmission system to execute their trades without substantial changes in current rules and institutions. Transmission-owning utilities could offer a limited number of traders access to transmission on a point-to-point basis (i.e., from the point of injection by the generator to the point of withdrawal by the customer load) at tariffs approved by the Commission and FERC. The suppliers might have to provide their own backup power and possibly provide some means of following the customer's loads, or they could negotiate to have the utility system operator perform that function at some agreed-upon price. Retail traders would have to negotiate in advance these and many other arrangements with the transmission owners and those who operate the system control centers. To implement their trades, traders would then have to submit schedules each day (probably for each hour) to the utility system operators who control transmission access and the dispatch. These schedules would at least tell the system operators where the power is being injected and where it is being withdrawn, the amounts and the times. Many details would have to be worked out between the traders and system operators at each affected control center,[8] and each of these details would have to be specified in one or more agreements.

Q. WHY WOULD SUCH DETAILED AGREEMENTS BE NECESSARY?

A. Detailed agreements would be necessary because inserting power at one point and withdrawing it from another within a free-flowing interconnected grid implicates many aspects of system operations that have cost consequences. Losses are incurred as the power is being transmitted and have to be made up; reliability requirements and grid congestion impose constraints on how much power can or must be generated or withdrawn at different locations. Each of these circumstances requires actions by the system operator that may require responses by various generators and loads on the system. These actions and responses have cost consequences. The effects do not raise a problem when only the utilities' generation is concerned, but that would not be the case in

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[8] Trades that scheduled power across more than one control area would have to be coordinated between the affected control area system operators.

a competitive market with other suppliers participating. In a competitive market, these cost consequences could not be ignored even if there were only a few market transactions, let alone if there were many, since ignoring them means that the costs would be shifted to someone else. In a competitive market, shifting any significant costs between competitors (or onto customers who were not market participants) would be regarded as unfair and would not be tolerated. In addition, the generators and customers involved in trades will invariably generate and consume more or less than the amounts they schedule with the system operators. These deviations require the system operator to call upon other generators to increase or decrease their output, and these actions also have cost consequences. The costs can be significant if the system is congested and complicated if the deviations span periods of time when the market values of energy and transmission are changing in response to changing supply and demand. Hence, accurate and fair mechanisms for dealing with all of these contingencies and allocating the costs fairly among the participants become essential to an efficient market, even in so-called simple approaches.

Q. WHAT ISSUES MUST BE RESOLVED TO IMPLEMENT A RETAIL TRADE?

A. The traders and system operators must define at least the following:

- Who provides or pays for various ancillary services and how such services should be priced for the independent traders?
- Who provides for losses on the system, including the incremental losses occasioned by the retail trades? How are losses priced if the system operator provides them?
- Who provides back-up when the supplier does not perform precisely as scheduled? If the system operator provides this back-up, what price does it charge to the traders?
- What happens to the alternative supplier's output when the retail buyer does not consume the amount scheduled? Is the supplier paid for its generation anyway? How much?

- What penalties, if any, apply when traders fail to meet their daily or hourly schedules?
- What happens when proposed trades contribute to grid congestion or violate one or more system reliability constraints?
- If congestion or reliability constraints require the system operator to curtail generation at some locations and raise it at others (which is how the system operator solves for congestion and constraints today) how does the system operator determine whose generation among competing suppliers gets dispatched up or down?
- How does the system operator determine the prices and payments for these actions?

When the Commission considers these questions, it will find that answers to most of them are not apparent by referring to traditional regulatory ratemaking. Different, preferably market-based solutions must be found, particularly for questions relating to how unbundled services provided by the system operator are priced. While other jurisdictions are dealing with these same issues, their individual solutions may not all be directly transferable to Arizona.

Q. IS IT REASONABLE TO PURSUE SOLUTIONS TO THESE ISSUES THROUGH INDIVIDUAL NEGOTIATIONS?

A. Such negotiations are not practical if the Commission contemplates rapid and broad application of retail competition. Again, if the Commission were proposing only a few such transactions, the above questions could be individually negotiated between each set of traders and each utility that operates a control center and eventually reduced to common tariffs that would simplify market entry for additional traders. There are certainly examples of such individual agreements throughout the industry that the Commission could examine. However, it is doubtful whether these ad hoc arrangements could be universally applied to all traders in a fully competitive market without shifting costs between competitors and consumers, particularly those consumers who continue to rely on bundled utility service. Historically the transaction costs associated with such individual negotiations have been substantial, and the costs could become prohibitive if each utility had a large number of traders with which it had to deal early on. Moreover, as the number of traders increased, the complexity of the issues would also increase, since the volume of trades that would have to be accommodated and scheduled on the transmission grid would begin to raise more difficult problems of coordination, congestion and reliability constraints, as well as requiring new software and procedures to handle the settlements associated with providing and pricing the ancillary services typically provided by the utility control center system operators.

Q. ARE THERE OTHER FACTORS THAT COMPLICATE RESOLUTION OF THESE ISSUES?

A. Yes. Today, each utility deals with these matters on a bundled basis and recovers the costs for them under traditional cost-of-service regulation, but in a competitive structure each of these services will have to be unbundled and priced in a fair manner, presumably in a way that reflects market-based values and avoids shifting costs between those who make their own deals and those who continue to rely on traditional bundled utility service. While all of these difficulties might be manageable if the system had to deal with only a few transactions, the situation would look quite different if retail competition were opened, as the Commission's proposed rules would require, to any substantial number of retail customers and the system operators and settlements systems had to deal with the potential for hundreds and possibly thousands of transactions and hourly schedules. Hence, the introduction of full retail competition will require that the Commission consider market-based mechanisms that efficiently price the system operator's services, as well as mechanisms to ensure that all market participants have comparable access to the services needed to support their trades.

V. MECHANISMS AND PRICING RULES TO SUPPORT A COMPETITIVE MARKET

A. The Role of a Spot Market

Q. SHOULD THE COMMISSION CONSIDER THE DEVELOPMENT OF A WHOLESALE SPOT MARKET?

A. This is one of the most important threshold issues for the Commission to address. A competitive spot market with transparent spot prices for each relevant product, time period and location is arguably the essential foundation for a competitive market. In one sense, the spot market is an alternative to contracts, but a transparent spot price also provides a useful reference from which buyers and sellers can evaluate the value of bilateral contracts. Another essential function of the spot market is to provide the mechanism for pricing key services, including balancing energy and transmission, that are necessary to support bilateral trades.

Q. HOW DOES A SPOT MARKET SUPPORT BILATERAL TRADES?

A. Many of the services necessary to support bilateral trades involve providing spot energy and transmission to back up bilateral trades and make up for imbalances between what the bilateral traders schedule in advance and what they actually generate and consume in real time. The spot market provides this balancing energy through the system operators' dispatch of flexible generation. When utility system operators provide this function in serving their own loads today, the costs are rolled into the rates on a bundled basis. A competitive market, however, needs some means to assign these costs to individual transactions. A spot market provides that mechanism.

Q. HOW SHOULD ENERGY BE PRICED IN A SPOT MARKET TO SUPPORT COMPETITION?

A. Other jurisdictions have decided to use some type of bid-based approach to give all generators comparable access to the dispatch and the market it serves. Each generator submits bids indicating the prices at which it is willing to operate at various levels of output and at specific times. Both utility and non-utility generators can submit such price/quantity bids under a common set of bidding protocols, allowing the system operator to compare the offers on a comparable basis and select the least-cost mix of generators to meet bid-in demand.

Q. DO SUCH BIDDING MECHANISMS IMPLY AN "EXCLUSIVE" OR "MANDATORY" POOL?

A. Not at all, although that is a common misconception.[9] If the Commission decides to support development of a bid-based spot market, it can insist that bidding rules be voluntary in several important ways and still result in an efficient spot market and dispatch. For example, the Commission could pose several questions:

- *Should bidding be optional?* Each generator can have the choice of whether or not to submit bids to the system operator. Generators with bilateral contracts can also be allowed to choose to submit bids or alternatively to simply schedule their contract amounts with the system operator.
- *Should generators be free to choose the price (and quantity) they bid?* In a voluntary system, rules can allow each generator to choose what to bid.[10] Of course, for an efficient spot market, the incentives should encourage (but need not require) bidders to bid their marginal costs, but rules can leave bidders free to bid in any way that expresses their economic preferences.
- *Should there be rules to restrict or limit bidding?* Again, in a voluntary spot market no generator would be restricted from participating in the voluntary bidding process to any degree it finds in its economic interests. There would be no restrictions on who can bid nor limits on the total capacity that the system operator will accept in bids.

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[9] For example, see the discussion in the Economic Impact Statement, p. 7.

[10] This assumes a competitive market without market power. Other jurisdictions are considering various means to restrict bidding behavior by generators found to have market power.

The Commission can consider these and other rules to help ensure that the system operator's dispatch is efficient and that the resulting spot market is voluntary, so that the spot prices are based on the economic preferences of market participants. In that way the "spot price" derived from the system operator's least-cost dispatch can be a truly "market-based" price.

Q. WHAT OTHER ISSUES SHOULD THE COMMISSION CONSIDER RELATING TO THE DEVELOPMENT OF AN EFFICIENT SPOT MARKET?

A. There are literally dozens of details that have to be thought through in designing an open, efficient and fair spot market. Once the Commission makes the threshold decisions about whether to develop a spot market and whether to have it coordinated by utility system operators or an ISO, these details can be developed in open workshops with participation by all affected parties and the Commission Staff. The Commission Staff's participation is especially critical to ensure that certain policy objectives are consistently represented in the discussions about alternative rules and protocols. The Staff's presence is also necessary to ensure that the Commissioners themselves have ready access to key information and explanations relating to the new rules and the issues they raise.

Q. WHAT ARE THE POLICY OBJECTIVES IN DESIGNING SPOT MARKET RULES?

A. As mentioned, the spot market needs to be voluntary, open without restriction to all market participants, efficient, non-discriminatory and based on sound economic principles. The Commission should examine such principles and, early on, enunciate these and related principles to guide the process of rules development.

B. Ancillary Services

Q. DOES THE SYSTEM OPERATOR'S SPOT MARKET ALSO PROVIDE A MEANS FOR ACQUIRING AND PRICING ANCILLARY SERVICES?

A. It can to some extent. The Commission should consider how ancillary services are provided and priced to support retail trading. In general, a spot market resulting from the system operator's economic dispatch can provide and price any ancillary service directly associated with the provision of energy. The balancing or load-following services are examples. When bilateral generators produce more or less than they schedule, the excess can be sold through the spot market at the locational spot price while the deficit can be bought through the spot market at the locational spot price. Similarly, the bilateral customer can purchase more energy than it scheduled or sell back energy it scheduled but didn't want through the spot market at the locational spot price. The system operator will automatically implement these trades as it balances loads and resources through the dispatch of flexible generators and loads; the traders need make no additional arrangements to receive this balancing service other than agreeing to pay or accept payment at the market-based locational spot prices.

However, not all ancillary services lend themselves to the daily competitive auctions associated with the system operator's spot market. Other jurisdictions that are working through these issues have concluded that voltage support and black-start capability, for example, should probably be procured on an annual basis; the pricing schemes are not related to the spot market. There are additional issues relating to market power that may also affect the ability to price ancillary service through the spot market.

C. Transmission Pricing

Q. SHOULD THE COMMISSION CONSIDER ALTERNATIVE WAYS OF PRICING TRANSMISSION?

A. Yes. These are matters that are within FERC's jurisdiction, but they have implications for state rate-setting and should be carefully considered by the Commission. Transmission pricing strongly affects the efficiency of market signals to encourage new investments in generation and transmission upgrades. If the pricing signals are inefficient, there is much greater need for state regulatory intervention in investment decisions. There are several different approaches being forwarded around the country, and sorting out the differences is not always easy. FERC appears to prefer postage stamp approaches, but other approaches may be acceptable. Some approaches necessarily involve consideration of other elements of market structure.

For example, several jurisdictions, including California, New York, PJM and the Pacific Northwest are developing variations of a common pricing approach that is tied to the system operator's spot market. This approach prices transmission use at its short-run opportunity cost.[11] FERC has already indicated that it is likely to find this an acceptable way to meet FERC's rules for non-discriminatory transmission pricing.[12] As long as there are no constraints or congestion, additional generation and loads can be supported by the grid, so the opportunity cost of transmission is zero. That is, there is no incremental cost for an incremental use of transmission. But when there are constraints or congestion, the opportunity cost of transmission is not zero and there is a positive value to transmission between affected points that needs to be reflected in the prices transmission users pay for trades between those points.

D. Transmission Rights

Q. SHOULD THE COMMISSION CONSIDER A SYSTEM OF TRANSMISSION RIGHTS TO SUPPORT A COMPETITIVE ELECTRICITY MARKET?

A. Yes. Any structure for a competitive electricity market must also provide a means by which market traders can acquire transmission rights, or at least, some means by which they can preserve the expected financial benefits of their trades even when transmission congestion and reliability constraints restrict the ability of the system operator to implement all scheduled trades.

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11 A separate charge is assessed to cover the fixed costs of the transmission system.

12 See Federal Energy Regulatory Commission, Order Directing Amendments to Proposals to Restructure the Pennsylvania-New Jersey-Maryland Interconnection and Providing Guidance, November 13, 1996, mimeo at p. 49.

Q. HOW DO NEW YORK, CALIFORNIA AND PJM DEFINE TRANSMISSION RIGHTS?

A. The concept relies on locational marginal cost pricing. It uses the difference in the market-clearing price for power at each location as the opportunity cost or price of transmission between points on the grid. Transmission rights are then defined as rights between discrete pairs of points on the grid, without respect to the "path" by which power is transmitted from one point to the other. In an interconnected grid with many loops, there will be numerous "paths" along which power will flow from generation to loads, but the transmission rights need not specify which of these paths is (are) implicated by a given trade. The rights function as financial hedges against congestion-related transmission charges that would otherwise apply to trades between the covered points.

Q. WHAT ISSUES MUST THE COMMISSION ADDRESS IN DEFINING TRANSMISSION RIGHTS?

A. There are several critical questions relating to how transmission rights are defined. First, the Commission must determine whether the proposed rights will be based on the locational pricing mechanism approach being developed in other jurisdictions or some other method. The Commission should pay particular attention to the efficiency of the pricing signals that alternative approaches send to generators, loads and potential investors in transmission upgrades. Second, the Commission should consider the mechanism by which transmission rights would be first acquired (or allocated) and how they might subsequently be traded. Additional issues focus on how to treat existing transmission contracts in conjunction with any newly created rights.

VI. ASSURING RELIABILITY

Q. WHAT EFFECT WILL THE INITIATION OF RETAIL COMPETITION HAVE ON THE ABILITY TO MAINTAIN RELIABLE SERVICE?

A. Depending on how the Commission decides to implement retail competition, it could have major implications for what reliability means, how it is assured and who provides it. The central question concerns the degree to which the Commission is willing to allow market-based prices to be the principal mechanism for assuring a balance between supply and demand, both in day-to-day operations and in long-run planning.

Q. DOES THE INTRODUCTION OF RETAIL COMPETITION LEAD TO A LESS RELIABLE SYSTEM?

A. There is no reason why that must occur. System reliability is affected by many factors, such as the adequacy of generation to meet expected loads, the frequency and duration of generation outages, the dependability and condition of key transmission facilities and the dependability and condition of distribution facilities. Of these factors, only the adequacy of available generation is potentially affected by retail competition.

Q. HOW WILL THE ADEQUACY OF GENERATION BE AFFECTED BY RETAIL COMPETITION?

A. Today, the amount of installed generating capacity is driven primarily by predefined reliability standards set by the NERC and WSCC and by each utility, subject to regulatory oversight. Each utility or load-serving entity is expected to own, have under contract or otherwise have readily available sufficient capacity to meet expected peak loads plus a reserve margin designed to cover a number of possible contingencies, such as unexpected higher demands, weather changes and planned or unplanned generation and transmission outages. Under its obligation to serve, each utility or load-serving entity is expected to acquire additional resources as needed to ensure that there are almost always sufficient supply resources available to meet the reliability requirements.

Q. WOULD UTILITIES CONTINUE TO BE SUBJECT TO THESE SAME RELIABILITY STANDARDS UNDER RETAIL COMPETITION?

A. That is a key issue for the Commission. Clearly, a utility facing retail competition has no assured level of demand that it can plan to meet. Under competitive access, a new means must be found to assure adequate generation capacity and recover its costs fairly from all customers.

Q. COULD RELIABILITY BE ADDRESSED SOLELY BY MARKETS AND MARKET PRICES?

A. In principle, yes. Retail competition means that consumers have the ability to choose from among alternative competing suppliers under prices agreed to by the market participants. In a competitive market, supply and demand are balanced by price. If supplies are short, prices rise and price-sensitive demand falls until supply and demand balance. Or if demand is high, prices rise and encourage more supply until supply and demand again balance.

In the short run, the system operator's dispatch necessarily will be used, just as it is today, to keep the system balanced, meet all reliability constraints, and maintain appropriate voltage and frequency levels. If there is an open spot market with transparent spot prices associated with the system operator's dispatch as well as contracts, then prices can also play an important role in balancing supply and demand, at least on a short-run basis. If suppliers are paid the market-clearing price and consumers pay the market-clearing price, the market should clear, so that each customer will be satisfied that it got all the power it wanted at that price and each generator will be satisfied that it was allowed to produce all the energy it wanted at the market-clearing price.

Importantly, the system operator must still apply short-run operational reserve standards to ensure that each day there will be enough resources to meet not only projected loads but also unexpected contingencies. In bid-based spot markets, each day, the system operator will accept price and quantity offers for additional resources to provide regulation, spinning, non-spinning and other types of standby reserves. In other states considering these issues, the assumption is that NERC and WSCC (or their regional counterparts elsewhere) will continue to define these operational reliability standards and that the utility system operators (or ISO) will have the responsibility to apply those standards.

In a purely energy market system, a mechanism is needed for curtailing load when there is no more capacity available. The mechanism proposed elsewhere is "demand bidding." Demand bids represent the willingness of loads to pay for energy, or conversely, the unwillingness of load to pay for energy if the price gets above a certain level. The more price-sensitive load there is, the more supply and demand are likely to balance at market-clearing prices. Moreover, demand bids allow markets to clear when supplies are short; in essence, with demand bids, market-clearing prices can rise to the level at which price-sensitive demand falls to meet available supplies. An energy market with demand bidding can work in theory, but it will only work in practice if 1) a large portion of customers pay real-time spot prices, and 2) the Commission is prepared to permit prices to rise to very high levels when capacity is very short.

Q. WHAT OTHER APPROACHES ARE BEING PROPOSED TO USE MARKET MECHANISMS TO ASSURE SUFFICIENT CAPACITY FOR RELIABLE OPERATION?

A. A common approach is to establish a capacity market at the wholesale level. The rules would require each load-serving entity to have under contract sufficient capacity to meet its reserve requirements (e.g., planning reserve requirements set by the WSCC). Alternative approaches create capacity spot markets or employ penalties for load-serving entities that lack adequate capacity. The market would function at the wholesale level because it would probably be impractical to require each retail load to meet such standards. Each wholesale load-serving entity would then be open to offers of capacity from any source, regardless of ownership, thus creating a level playing field for those competing to supply the capacity market. The costs of acquiring the resources would then be recovered in market prices charged to customers.

Q. WHO HAS RESPONSIBILITY FOR MEETING LONG-RUN RELIABILITY STANDARDS IN A COMPETITIVE MARKET?

A. This is where state regulators have important policy issues to resolve. They cannot directly impose long-run planning reserve standards on utilities and other load-serving entities, since these entities have no assured long-term load. Rather, short-term mechanisms must be designed that will induce the long-lived investments in capacity that are needed.

VII. MARKET POWER

Q. WILL A MARKET POWER ANALYSIS BE REQUIRED TO IMPLEMENT THE COMMISSION'S GOALS?

A. Yes. FERC requires that any proposal that uses market-based pricing at the wholesale level must be accompanied by a market-power analysis that demonstrates there is no significant market power or that such market power has been or will be mitigated by effective means. The Arizona Commission also will wish to assure itself that its regulatory reforms will not result in monopoly pricing of deregulated wholesale or retail electricity.

Q. WHAT DOES A MARKET POWER ANALYSIS INCLUDE?

A. The most common analysis being used for this purpose requires an examination of the degree of competitiveness over the relevant geographic market for each relevant product. The study typically examines each product, such as energy, and determines the scope of the geographic market in which that product can be bought and sold. It then examines the market shares of the market participants in the geographic market for each product. If markets are concentrated or one or more firms are dominant, there is a presumption of market power that requires some type of mitigation.

Q. DOES THE ANALYSIS ALSO HAVE TO CONSIDER THE MARKET STRUCTURE AND PRICING RULES?

A. Yes. The analysis must start with a thorough understanding of the market structure, including the scope and operations of any spot and bilateral markets, the relative freedom to move between the two, the degree of open access to transmission, treatment of congestion, pricing of transmission, provision of ancillary services and other factors. Hence, no competent analysis of market power can be performed until these elements are known, since market arrangements and Commission regulations can enhance or limit market power.

Q. IS MARKET POWER LIKELY TO BE A PROBLEM IN ARIZONA?

A. While I have made no study of it, my general familiarity with the Arizona electricity industry indicates that it is unlikely to be a major problem. Very large transmission systems connect Arizona to adjacent states and large amounts of competing generation. An unusually high proportion of generation in Arizona is owned by non-Arizona utilities. Arizona utilities export significant electricity. These factors all suggest that market electricity prices in Arizona will be "net-back" from prices in a marketplace in which even the largest Arizona generator is a small player.

VIII. IMPLEMENTING RETAIL COMPETITION

A. Unbundling

Q. WHAT ISSUES SHOULD THE COMMISSION CONSIDER WITH RESPECT TO UNBUNDLING?

A. "Unbundling" is a broad term used to describe the process of distinguishing each of the various components of electricity service and providing a mechanism to secure and price each element. Unbundling serves two purposes for a competitive market. First, it allows competitive providers to offer the unbundled service in competition with the utility; second it provides a means for charging those who use each service and paying those who provide it, on a non-discriminatory basis.

Two kinds of issues arise. First, which services should be unbundled? Second, how should each unbundled service be priced?

Q. WHAT ISSUES ARISE IN DECIDING WHICH SERVICES TO UNBUNDLE?

A. There may be some services that cannot be unbundled sufficiently to allow individual pricing or cost allocation. The difficulty arises from the inability to assign cost responsibility to individual market participants or customers. Some services are simply joint products, such that cost responsibility cannot be allocated accurately to individual users. Hence, it is probably not possible to unbundle every electricity service. As a general rule, however, the Commission should examine each service individually to determine whether it is either desirable or feasible to provide and price that service on an unbundled basis.

Q. ARE THERE SERVICES AT THE CUSTOMER LEVEL THAT SHOULD BE UNBUNDLED?

A. That is an important policy question for the Commission. It is certainly possible to have a form of competition at the retail level and only unbundle services at the generation level. Such a market could be very competitive in the provision of bulk energy. However, a totally competitive retail market would require the Commission to go further and unbundle "retailing" from the common carrier distribution function. The dividing line is far from clear; metering as well as meter reading and billing could be either retailing or distribution. In addition, utilities currently provide demand-side management services to their customers, but these services could be provided by competing energy service companies under the right conditions.

Q. WHAT ISSUES ARISE WITH RESPECT TO CUSTOMER-SIDE UNBUNDLING?

A. An important issue that arises centers on access to customer information and the related questions of confidentiality. If retailing is to be competitive, then all competitors must have access to customer information, subject to whatever confidentiality protection the customer requires. The Commission must decide what information must be made available and how customers' rights are protected.

Q. WILL NEW METERS BE REQUIRED TO IMPLEMENT A RETAIL COMPETITIVE MARKET?

A. Eventually, yes. A truly competitive market will price energy and related electricity service based on market value. Since the market value of energy can change dramatically throughout the day and over the seasons and depending on grid conditions, market-based pricing will require that customer meters be able to track energy use by designated time periods -- probably hourly or even half-hourly. Most customers do not have time-of-use meters today.

As discussed in connection with the need for a settlements system, it is essential to know when the customers of a load-serving entity took electricity, even if those customers themselves are not paying real-time prices. Optimally, this is achieved by hourly metering for each customer. In the near term, an alternative approach is to use load profiles to allocate monthly consumption to a time-of-use profile. However, this system requires considerable load research and a complex settlements system; if not done correctly, it can result in significant cost shifts.

Q. DOES CUSTOMER-SIDE UNBUNDLING TAKE ADDITIONAL TIME?

A. It takes time, probably more than a year, judging by other states' efforts. It if it done as an afterthought, and commences only after the market structure and pricing rules are developed, it will delay the start of the competitive market. If done simultaneously, it will tax the resources of affected parties. In California, for example, most parties, including the utilities themselves, find it extremely difficult to participate effectively in both the WEPEX market-structure proceedings and retail access/unbundling workshops that have been occurring simultaneously. As mentioned before, developing a truly competitive electricity market requires an exhaustive effort by all concerned.

B. Providing Retail Access

Q. ARE THE TARGETS FOR INTRODUCING COMPETITION TO EACH RETAIL CUSTOMER GROUP ATTAINABLE?

A. The aggregate phase-in targets for total demand are probably more feasible than the discrete targets for individual customer classes. In particular, it is doubtful that systems necessary to accommodate 15 percent of residential customers can be in place by 1999. While it is certainly possible for each regulated utility to declare that 15 percent of its retail customers are eligible for competition, it is quite another thing to expect all metering, billing, settlement and scheduling issues to be resolved and sufficient meters to be installed by 1999 so that 15 percent of each utility's residential customers can participate directly in a competitive market on an individual or even aggregated basis. However, other jurisdictions have considered market mechanisms other than those apparently assumed in the Commission's proposed rules that could bring most of the benefits of a competitive market to more residential customers on an early schedule.

Q. WHAT STEPS ARE NEEDED TO GIVE RETAIL CUSTOMERS THE BENEFITS OF COMPETITION?

A. Bringing the benefits of competition to retail consumers requires two principal elements: First, the retail consumer must be physically connected via the transmission/distribution system to competing energy suppliers. That element already exists for every utility customer. Second, the retail consumer must have access to market-based prices. This is the area in which there are various policy options.

The only mechanism included in the proposed rules is to give retail customers the opportunity to contract directly with alternative suppliers. For an individual consumer to participate in this approach it must therefore actively participate as a buyer in the market or authorize a broker or aggregator to participate on its behalf. The customer may be required to have a time-of-use meter and must have energy usage high enough to justify the transaction costs associated with market participation.

Alternative approaches can be based on either direct or indirect access to the spot market. New York and California are developing these approaches to give consumers more options than direct bilateral contracts.

Q. WOULD TIME-OF-USE METERS BE NECESSARY TO TAKE FULL ADVANTAGE OF BILATERAL CONTRACTS?

A. Yes. The spot price would vary over time, with prices generally higher during peak periods and lower during off-peak periods, whether looking at a single day or over the week or the seasons. To get the full advantages of the competitive spot market and to ensure proper billing for imbalances (deviations from contract schedules), customers would need time-of-use meters that could measure consumption for each market period. In most jurisdictions with coordinated spot markets, the market period is either a half-hour or an hour.

Q. WHY ARE MULTI-YEAR PHASE-INS USUALLY ASSOCIATED WITH THE INTRODUCTION OF RETAIL COMPETITION?

A. Phase-ins are usually suggested to solve several problems: The first is that it takes a lot of time to get sufficient time-of-use meters installed for every consumer that is eligible. The second is that there has to be an accounting or "settlement" mechanism in place that can keep track of the hourly amounts scheduled, generated and consumed and match those against the hourly spot prices to be paid or charged for any amounts not covered by contracts. Since any contract can involve at least some deviation from schedules, the settlement system must be able to perform all the accounting that will arise so as to bill each supplier and customer accurately. When this task is multiplied by the potential for thousands of transactions, the accounting burden becomes enormous. A phase-in is probably needed to allow the necessary software and hardware to be developed and put in place for an efficient settlement system. A third problem is the lack of experience with retail competition. Phase-ins give both regulators and market participants additional time to test market and pricing mechanisms, to discover problem areas and design appropriate solutions.

IX. STRANDED COSTS

Q. HAS THE COMMISSION ADEQUATELY CONSIDERED STRANDED COSTS IN THE PROPOSED RULES?

A. No. The proposed rules state that workshops to consider mechanisms for analyzing and recovering stranded costs will commence following adoption of the rules and imply that there will be hearings before the Commission to consider the extent to which stranded costs will be recoverable.[13] While the draft rules state that all unmitigated stranded costs will be recoverable, the eleven factors governing recovery create an ambiguous picture of how this will occur. Ambiguity about stranded costs must be resolved before serious progress can be made to implement retail access.

Q. WHAT COULD THE RULE DO TO RESOLVE THE STRANDED COST ISSUE?

A. First, the Commission needs to articulate clear principles that will apply. For example, the Commission should state unequivocally that each affected utility will be given a truly fair and reasonable opportunity to recover all legitimate and verifiable transition costs. A corollary principle is that retail access should not provide a means for customers of any category to bypass their fair share of the legitimate and verified transition costs resulting from the initiation of a competitive retail market. Similarly, retail competition should not be permitted to shift transition costs from one customer class to another. The Commission should therefore announce that all customers and customer classes will have a continuing obligation to pay their fair share of such costs through some type of non-bypassable charge.

Second, the Commission would do well to caution all market participants that the Commission will carefully scrutinize any attempts to arrange special deals between select customers and market competitors where such arrangements commence prior to the date when the new competitive market structure begins operations. All competitors and

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[13] See, Proposed Rules, R14-2-1607 E and I.

customers should have an equal opportunity to participate once the market begins, but attempts to jump the gun before all the market rules and institutions are in place should be discouraged.

Third, the Commission should determine, as a threshold issue, the extent to which it will allow stranded cost recovery mechanisms to affect the direction of existing rates. For example, the Commission may decide that accelerated depreciation of utility generation assets is a worthwhile strategy in order to bring utility generation to market as soon as practicable. At the same time, the Commission could have a policy that restricts accelerated depreciation in ways that do not raise current rates. These kinds of threshold policy determinations would then provide the framework within which alternative transition cost recovery plans could be developed and evaluated. Clearly, it is important that time frames for recovery be consistent with such rate restrictions.

Q. WHAT MECHANISMS ARE OTHER STATES CONSIDERING FOR COLLECTING STRANDED COSTS?

A. Most states have concluded that there should be a non-bypassable charge on all utility customers, probably assessed as a "wires" charge. Since consumers will be able to purchase energy from alternative suppliers, it would be difficult to recover transition costs as part of the energy charge. The Commission must therefore consider whether the non-bypassable charge for transition costs should be placed on the transmission/distribution part of the customer's total bill.

Q. ARE THERE JURISDICTIONAL ISSUES THAT ARISE IN A RETAIL SETTING IF TRANSITION COSTS ARE COLLECTED THROUGH A TRANSMISSION OR DISTRIBUTION CHARGE?

A. Yes. The Commission's proposed rules describe retail competition in terms that involve only direct supplier-to-customer contracts, with the utility required to "wheel" or transmit power from supplier to customer. Traditionally, FERC has honored the distinction between transmission and distribution, assuming jurisdiction over the former and ceding to the states jurisdiction over the latter. However, the "retail wheeling" concept implies that the utility provides transmission access all the way from the generator to the load, implying that the entire wires connection is "transmission" and hence exclusively FERC-regulated. When the California Commission considered this question it voiced concerns that exclusive FERC jurisdiction could preclude the state from using a state-imposed wires charge to recover transition costs. Thus, in the applications to FERC, California utilities have specifically requested that FERC acknowledge that at least some state jurisdiction exists for some segment of the wires called "distribution" in order to have some means by which the state can levy a wires-based charge for transition costs. FERC has since issued Order 888 which, among other things preserves the transmission/distribution distinction and provides seven criteria for determining whether a given line falls in one category or the other.[14] Recently, the FERC ratified the California split between transmission facilities dedicated to the ISO and distribution facilities remaining under state jurisdiction. This issue may well be resolved satisfactorily by the time Arizona utilities file at FERC, but the Commission should monitor the resolution of this question at FERC.

Q. HOW SHOULD THE COMMISSION DETERMINE THE AMOUNT OF STRANDED GENERATION COSTS?

A. This is another important threshold issue for the Commission. Stranded generation costs are those that the entity owning the generation cannot recover from market-based prices or through market valuation of the asset, such as through a spin-off or sale. Hence, to determine the amount of stranded costs, the Commission must have some means to determine market value or market price. If the Commission attempts to determine the level of stranded costs in advance, it must confront all of the uncertainties of forecasting market values and prices and then have some means to deal with the consequences when the forecasts turn out to be wrong, as they inevitably will. If the Commission decides to rely on some market-based evaluation or market pricing to help it determine stranded costs, it

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[14] Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities and Recovery of Stranded Costs by Public Utilities and Transmitting Utilities. 61 Fed. Reg. 21,540 (May 10, 1996), FERC Stats. & Regs. ¶31,036.

simply is defaulting the forecasting task to "the market." A third choice is to determine stranded costs based on future market prices and costs. This reduces or even eliminates the forecasting problem but can reduce incentives to minimize costs.

Q. WHAT ISSUES ARISE UNDER THE FORECASTING APPROACH?

A. Forecasting stranded costs may be worthwhile to get a general estimate of the magnitude of the problem, but forecasting as a means of setting a final number poses risks for the utilities or ratepayers and competitors, depending on which way the forecast errs. If the forecast of stranded costs is too high, the utility will be over-compensated at the expense of ratepayers and competitors; if the forecast is too low, the utility investors are unfairly penalized, with resulting negative impact on the utilities financial structure and its ability to raise capital to continue those transmission and distribution functions that will likely remain part of the utility monopoly.

Q. WHAT ISSUES ARISE IN THE MARKET EVALUATION APPROACH?

A. The issues have to do with timing and process. As mentioned before, a market evaluation approach requires that all market structures and pricing rules be fully understood by those involved in the market evaluation. Arizona is probably two to three years away from that stage. Even when the rules are known, some uncertainty will remain until market participants have gained some experience with the new structure and rules. In addition, market values and prices will vary depending on seasons and grid conditions. Hence, it may be necessary to go through a year or so under the new market before market evaluators have a clear sense of the market value of existing generation assets. In the meantime, however, it is possible for the Commission to establish procedures that track utility revenues gained from market prices relative to what the Commission already knows about utility costs. The degree of stranded costs can thus be determined over time using actual market prices, even as market participants are gaining experience with the new market structure and rules.

Q. OTHER STATES, INCLUDING PENNSYLVANIA AND CALIFORNIA, ARE PROPOSING TO SECURITIZE STRANDED COSTS? WHAT ARE THE POTENTIAL BENEFITS OF SECURITIZATION?

A. For California, at least, securitization first provides a means to finance immediate rate relief for customers. California legislators regarded this as a primary concern, since rates for residential and small commercial customers of California investor-owned utilities have been some of the highest in the country, and small consumers were assumed to be unlikely to benefit from bilateral contracting. However, securitization is also attractive to the utilities and their investors, since the utility receives the revenues from the sale of bonds as soon as the sale occurs. Since the statute allows up to $10 billion in bonds to be outstanding at any one time, the mechanism thus provides the possibility that the California utilities can recover 40 to 50 percent of their stranded cost in a very short period, thus reducing the financial risk to the utility and its investors. Aside from providing a large amount of cash up front, securitization also lowers capital costs for other utility investments by reducing the level of outstanding capital and the risks faced by the utility. In general, these are highly attractive features for any utility.

Q. DOES THIS COMPLETE YOUR TESTIMONY?

A. Yes, it does.

WILLIAM H. HIERONYMUS **Director**

William Hieronymus has consulted extensively to managers of electricity and gas companies, their counsel, regulators and policy makers. His principal areas of concentration are the structure and regulation of network utilities and associated management, policy and regulatory issues. He has spent the last several years working on restructuring and privatization of utility systems internationally and on changing regulatory systems and management strategies in mature electricity systems. In his twenty years of consulting to this sector he also has performed a number of more specific functional tasks including the selection of investments, determining procedures for contracting with independent power producers, assistance in contract negotiation, tariff formation, demand forecasting and fuels market forecasting. Dr. Hieronymus has testified frequently on behalf of utility clients before regulatory bodies, federal courts and legislative bodies in the United States and United Kingdom. Since joining Putnam, Hayes & Bartlett, Inc. (PHB) he has contributed to numerous projects, including the following:

ELECTRICITY SECTOR STRUCTURE, REGULATION AND RELATED MANAGEMENT AND PLANNING ISSUES

U.S. Assignments

- Dr. Hieronymus serves as an advisor to a western electric utility on restructuring and related regulatory issues and has worked with senior management in developing strategies for shaping and adapting to the emerging competitive market in electricity. As a part of this general assignment he helped develop a settlement with the state regulatory commission staff that provides, among other things for accelerated recovery of strandable assets. He also prepared numerous briefings for the senior management group on various topics related to restructuring.

- For several utilities seeking merger approval he has prepared market power analyses for filing at FERC and with state commissions. These analyses cover the destination market-oriented traditional FERC tests, Justice Department-oriented market structure tests, behavioral tests of the ability to raise prices and examination of market power arising from transmission and generation ownership relevant to the emerging competitive bulk power markets.

- For utilities and power pools preparing structural reforms, he has assisted in examining various facets of proposed reforms, or of individual utility actions, that have potential consequences in for market power or for achieving the clients strategic objectives.

- As part of a large PHB team he assisted a midwest utility in developing an innovative proposal for electricity industry restructuring. This work formed the basis for that utility's proposals in its state's restructuring proceeding.

- Dr. Hieronymus has contributed to a large PHB project involving restructuring of the California electricity industry. Proposals made by PHB's clients are a primary basis for the CPUC majority's restructuring plan.

- He has contributed to the development of benchmarking analyses for U.S. utilities. These have been used in work with PHB's clients to develop regulatory proposals, set cost reduction targets, restructure internal operations and assess merger savings.

- Dr. Hieronymus was a co-developer of a market simulation package that PHB has tailored to region-specific applications. He and other PHB personnel have provided numerous multi-day training sessions using the package to help our utility clients in educating management personnel in the consequences of wholesale and retail deregulation and in developing the skills necessary to succeed in this environment.

- Dr. Hieronymus has made numerous presentations to U.S. utility managements on the U.K. electricity system and has arranged tours to meet key participants in the U.K. system for the senior managements of U.S. utilities.

- For a task force of utilities, regulators, legislators and other interested parties created by the Governor's office of a northeastern state he prepared background and briefing papers as part of a PHB assignment to assist in developing a consensus proposal for electricity industry restructuring.

- Dr. Hieronymus assisted a northeastern utility in drafting its submission to a state PUC proceeding on the measurement and recovery of stranded costs and has assisted various other utilities in their internal studies of stranded costs.

- For an East Coast electricity holding company, he prepared and testified to an analysis of the logic and implementation issues concerning utility-sponsored conservation and demand management programs.

- In connection with nuclear generating plants nearing completion, he has testified in Pennsylvania, Louisiana, Arizona, Illinois, Missouri, New York, Texas, Arkansas, New Mexico and before the Federal Energy Regulatory Commission in plant-in-service rate cases on the issues of equitable and economically efficient treatment of plant cost for tariff setting purposes, regulatory treatment of new plants in other jurisdictions, the prudence of past system planning decisions and assumptions, performance incentives and the life-cycle costs and benefits of the units. In these and other utility regulatory proceedings, Dr. Hieronymus and his colleagues have provided extensive support to counsel, including preparation of interrogatories, cross-examination support and assistance in writing briefs.

- On behalf of utilities in the states of Michigan, Massachusetts, New York, Maine, Indiana, Pennsylvania, New Hampshire and Illinois, he has submitted testimony in regulatory proceedings on the economics of completing nuclear generating plants that are currently under construction. His testimony has covered the likely cost of plant completion, forecasts of operating performance and extensive analyses of ratepayer and shareholder impacts of completion, deferral and cancellation.

WILLIAM H. HIERONYMUS
Director

- For utilities engaged in nuclear plant construction, Dr. Hieronymus has performed a number of highly confidential assignments to support strategic decisions concerning continuing the construction projects. Areas of inquiry included plant cost, financial feasibility, power marketing opportunities, the impact of potential regulatory treatments of plant cost on shareholders and customers and evaluation of offers to purchase partially completed facilities.
- For an eastern Pennsylvania utility that suffered a nuclear plant shutdown due to NRC sanctions relating to plant management, he filed testimony regarding the extent to which replacement power cost exceeded the costs that would have occurred but for the shutdown.
- For a major midwestern utility, he headed a team that assisted senior management in devising its strategic plans including examination of such issues as plant refurbishment/life extension strategies, impacts of increased competition and diversification opportunities.
- On behalf of two West Coast utilities, he testified in a needs certification hearing for a major coal-fired generation complex..
- For a large western combination utility, Dr. Hieronymus participated in a major 18-month effort to provide it with an integrated planning and rate case management system. His specific responsibilities included assisting the client in design and integration of electric and gas energy demand forecasts, peak load and load shape forecasts and forecasts of the impacts of conservation and load management programs.
- For two midwestern utilities, he prepared an analysis of intervenor-proposed modifications to the utilities' resource plans. He then testified on their behalf before a legislative committee..
- For a major combination electric and gas utility, he directed the adaptation of a PHB-developed financial simulation model for use in resource planning and evaluation of conservation programs.

U.K. Assignments

- Following promulgation of the White Paper setting out the general framework for privatization of the electricity industry in the United Kingdom, Dr. Hieronymus participated extensively in the task forces charged with developing the new market system and regulatory regime. His work on behalf of the Electricity Council and the twelve regional electricity councils focused on the proposed regulatory regime, including the price cap and regulatory formulas, and distribution and transmission use of system tariffs. He was an active participant in industry-government task forces charged with creating the legislation, regulatory framework, initial contracts and rules of the pooling and settlements system. He also assisted the regional companies in the valuation of initial contract offers from the generators, including supporting their requirement for contracts with the proposed nuclear power plants that subsequently were canceled as being non-commercial.

- During the preparation for privatization, he assisted several of the U.K. individual electricity companies in understanding the evolving system, in development of use of system tariffs, and in developing strategic plans and management and technical capabilities in power purchasing and contracting. He continues to advise a number of clients, including regional companies, power developers, large industrial customers and financial institutions on the U.K. power system.

- Dr. Hieronymus assisted four of the regional electricity companies in negotiating equity ownership positions and developing the power purchase contracts for an 1,825 megawatt combined cycle gas station. He also assisted clients in evaluating other potential generating investments including cogeneration and non-conventional resources.

- He also has consulted on the separate reorganization and privatization of the Scottish electricity sector. PHB's role in that privatization included advising the largest of the two Scottish companies and, through them, the Secretary of State on all phases of the restructuring and privatization, including the drafting of regulations, asset valuation and company strategy.

- He has assisted one of the Regional Electricity Companies in England and Wales in the 1993 through 1995 regulatory proceedings that reset the price caps for its retailing and distribution businesses. Included in this assignment have been policy issues such as incentives for economic purchasing of power, the scope of price control, and the use of comparisons among companies as a basis for price regulation. His model for determining network refurbishment needs was used by the regulator in determining revenue allowances for capital investments.

- He assisted this same utility in its defense against a hostile takeover, including preparation of its submission to the Cabinet Minister who had the responsibility for determining whether the merger should be referred to the competition authority.

Assignments Outside the U.S. and U.K.

- For the European Bank for Reconstruction and Development he performed analyses of least cost power options, evaluation of the return on a major plant investment that the Bank was considering and forecasts of electricity prices in support of assessment of a major investment in an electricity intensive industrial plant.

- For the OECD he performed a study of energy subsidies worldwide and the impact of subsidy elimination on the environment, particularly on greenhouse gases.

- For the Magyar Villamos Muvek Troszt, the electricity company of Hungary, he developed a contract framework to link the operations of the different entities of an electricity sector in the process of moving from a centralized command and control system to a decentralized, corporatized system.

- For Iberdrola, the largest investor-owned Spanish electricity company, he assisted in development of their proposal for a fundamental reorganization of the electricity sector, its means of compensating generation and distribution companies, its regulation and the phasing out of subsidies. He also has assisted the company in evaluating generation expansion options and in valuing offers for imported power.

- Dr. Hieronymus contributed extensively to a project for the Ukrainian Electricity Ministry, the goal of which is to reorganize the Ukrainian electricity sector and prepare it for transfer to the private sector and the attraction of foreign capital. The proposed reorganization will be based on regional electricity companies, linked by a unified central market, with market-based prices for electricity.

- At the request of the Ministry of Power of the USSR, Dr. Hieronymus participated in the creation of a seminar on electricity restructuring and privatization. The seminar was given for 200 invited Ministerial staff and senior managers for the USSR power system. His specific role was to introduce the requirements and methods of privatization. Subsequent to the breakup of the Soviet Union, he continued to advise the Russian energy and power ministry and government-owned generation and transmission company on restructuring and market development issues.

- On behalf of a large continental electricity company he has analyzed the directives from the European Commission on electricity transit and on the internal market for electricity. The purpose of this assignment was to develop forecasts of likely developments in the structure and regulation of the electricity sector in the common market. Subsequent assignments are focused on member state implimentation and company strategy.

- For the electric utility company of the Republic of Ireland, he assessed the likely economic benefit of building an interconnector between Eire and Wales for the sharing of reserves and the interchange of power.

- For a task force representing the Treasury, electric generating and electricity distribution industries in New Zealand, he undertook an analysis of industry structure and regulatory alternatives for achieving economically efficient generation of electricity. The analysis explored how the industry likely would operate under alternative regimes and implications for asset valuation, electricity pricing, competition and regulatory requirements.

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TARIFF DESIGN METHODOLOGIES AND POLICY ISSUES

- Dr. Hieronymus has participated in a series of studies for the National Grid Company of the United Kingdom and for ScottishPower on appropriate pricing methodologies and prices for transmission pricing.
- For a U.S. utility client, he directed an analysis of time-differentiated costs based on accounting concepts. The study required selection of rating periods and allocation of costs to time periods and within time periods to rate classes.
- For EPRI, he directed a study that examined the effects of time-of-day rates on the level and pattern of residential electricity consumption.
- For the EPRI-NARUC Rate Design Study, Dr. Hieronymus developed a methodology for designing optimum cost-tracking block rate structures.
- On behalf of a group of cogenerators, he filed testimony before the Energy Select Committee of the UK Parliment on the effects of prices on cogeneration development.
- For the Edison Electric Institute (EEI), he prepared a statement of the industry's position on proposed federal guidelines on fuel adjustment clauses. He also assisted EEI in responding to the U.S. Department of Energy (DOE) guideline on cost-of-service standards.
- For private utility clients, he assisted in the preparation of comments on draft Federal Energy Regulatory Commission (FERC) regulations and in preparing their compliance plans for PURPA Section l33.
- For the EEI Utility Regulatory Analysis Program, he co-authored an analysis of the DOE position on the purposes of the Public Utilities Regulatory Policies Act of 1978. The report focused on the relationship between those purposes and cost-of-service and ratemaking positions under consideration in the generic hearings required by PURPA.
- For a state utilities commission, Dr. Hieronymus assessed its utilities' existing automatic adjustment clauses to determine their compliance with PURPA and recommended modifications.
- For the DOE, he developed an analysis of automatic adjustment clauses currently employed by electric utilities. The focus of this analysis was on efficiency incentive effects.
- For the commissioners of a public utility commission, he assisted in preparation of briefing papers, lines of questioning and proposed findings of fact in a generic rate design proceeding.

SALES FORECASTING METHODOLOGIES FOR GAS AND ELECTRIC UTILITIES

- For the White House Sub-Cabinet Task Force on the future of the electric utility industry, Dr. Hieronymus co-directed a major analysis of "least-cost planning studies" and "low-growth energy futures." That analysis was the sole demand-side study commissioned by the task force and formed an important basis for the task force's conclusions concerning the need for new facilities and the relative roles of new construction and customer side-of-the-meter programs in utility planning.

- For a large eastern utility, he developed a load forecasting model designed to interface with the utility's revenue forecasting system- planning functions. The model forecasts detailed monthly sales and seasonal peaks for a 10-year period.

- For the DOE, he directed the development of an independent needs assessment model for use by state public utility commissions. This major study developed the capabilities required for independent forecasting by state commissions and constructed a forecasting model for their interim use.

- For several state regulatory commissions, Dr. Hieronymus has consulted in the development of service area level forecasting models of electric utility companies.

- For EPRI, he authored a study of electricity demand and load forecasting models. The study surveyed state-of-the-art models of electricity demand and subjected the most promising models to empirical testing to determine their potential for use in long-term forecasting.

- For a midwestern electric utility, he has provided consulting assistance in improving its load forecast and has testified in defense of the revised forecasting models.

- For an East Coast gas utility, he testified with respect to sales forecasts and provided consulting assistance in improving the models used to forecast residential and commercial sales.

OTHER STUDIES PERTAINING TO REGULATED AND ENERGY COMPANIES

- In a number of antitrust and regulatory matters, Dr. Hieronymus has performed analyses and litigation support tasks. These include both Sherman Act Section One and Two cases, contract negotiations, generic rate hearings, ITC hearings and a major asset valuation suit. In a major antitrust case, he testified with respect to the demand for business telecommunications services and the impact of various practices on demand and on the market share of a new entrant. For a major electrical equipment vendor he has testified on damages with respect to alleged defects and associated fraud and warranty claims.

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- For a private client, he headed a project that examined the feasibility and value of a major synthetic natural gas project. The study analyzed both the future supply costs of alternative natural gas sources and the effects of potential changes in FPC rate regulations on project viability. The analysis was used in preparing contract negotiation strategies.

- For a industrial client considering development and marketing of a total energy system for cogeneration of electricity and low-grade heat, he developed an estimate of the potential market for the system by geographic area.

- For the U.S. Environmental Protection Agency (EPA), Dr. Hieronymus was the principal investigator in a series of studies for forecasting future supply availability and production costs for various grades of steam and metallurgical coal to be consumed in process heat and utility uses.

Dr. Hieronymus has addressed a number of conferences on such issues as market power, industry restructuring, utility pricing in competitive markets, international developments in utility structure and regulation, risk analysis for regulated investments, price squeezes, rate design, forecasting customer response to innovative rates, intervenor strategies in utility regulatory proceedings, utility deregulation and utility-related opportunities for investment bankers.

Before joining PHB, Dr. Hieronymus was program manager for Energy Market Analysis at Charles River Associates. Previously, he served as a project director at Systems Technology Corporation and as an economist while serving in the U.S. Army. He is a present or past member of the American Economics Association and the International Association of Energy Economists, and a past member of the Task Force on Coal Supply of the New England Energy Policy Commission. He is the author of a number of reports in the field of energy economics and has been an invited speaker at numerous conferences.

Dr. Hieronymus received a B.A. from the University of Iowa and M.A. and Ph.D. degrees in economics from the University of Michigan.